

# **HYT**

## **SERVICE MANUAL TWO-WAY RADIO**

# ***TC-610P***

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## **Introduction**

### **Manual Scope**

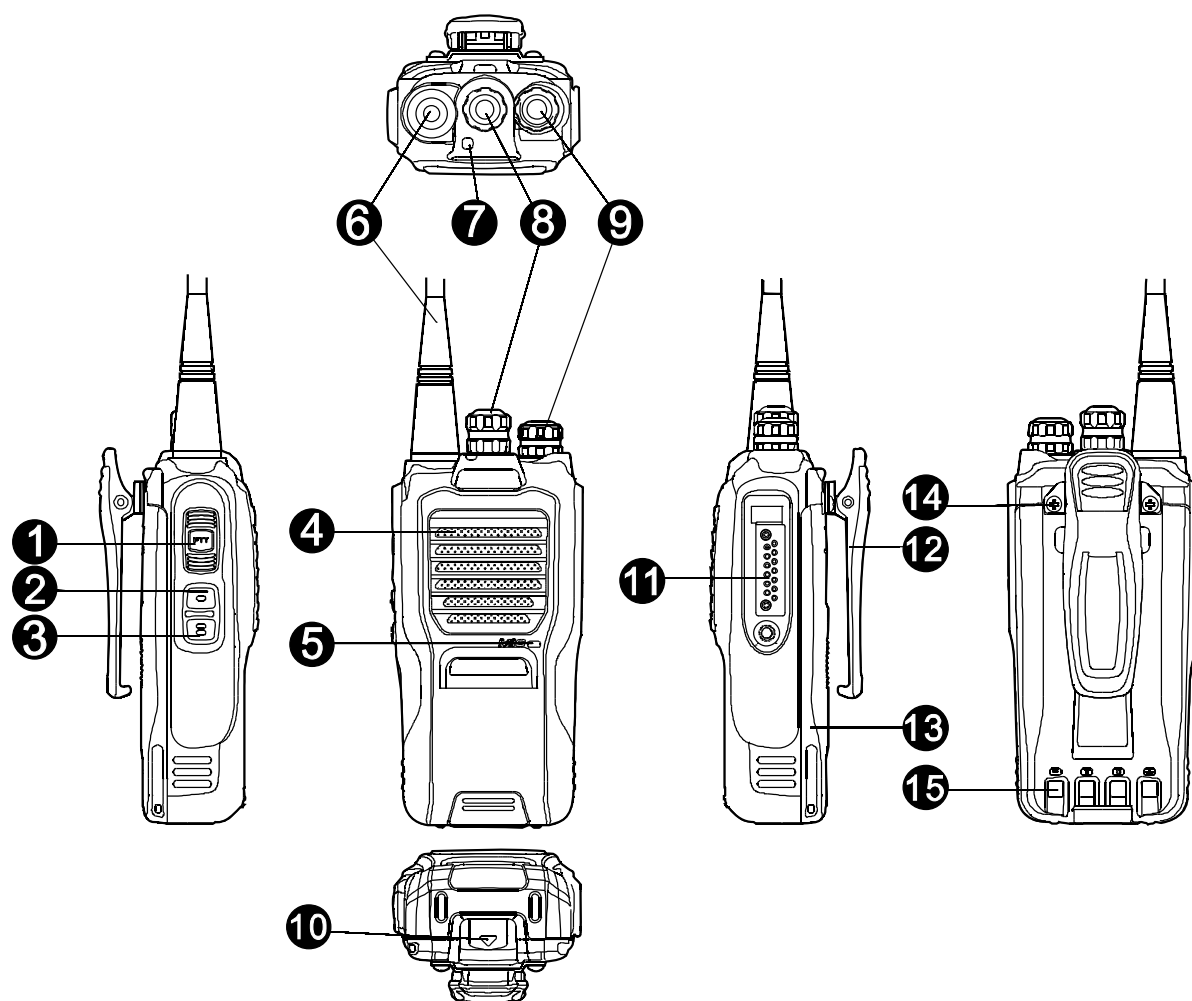
This manual is intended for use by experienced technicians familiar with similar types of communication equipment. It contains all service information required for the equipment and is current as of the publication date.

## **Safety Information**

The following safety precautions shall always be observed during operation, service and repair of this equipment.

- ◇ This radio shall be serviced by qualified technicians only.
- ◇ Only use HYT supplied or approved batteries and chargers.
- ◇ To avoid electromagnetic interference and/or compatibility conflicts, turn off your radio in any area where posted notices instruct you to do so. Turn off your radio before boarding an aircraft. Any use of the radio must be in accordance with airline regulations or crew instructions.
- ◇ For vehicles with an air bag, do not place a radio in the area over an air bag or in the air bag deployment area.
- ◇ Turn off your radio prior to entering any area with explosive and flammable materials.
- ◇ Do not charge or replace your battery in a location with explosive and flammable materials.
- ◇ Turn off your radio before entering a blasting area.
- ◇ Do not use any portable radio that has a damaged antenna. If a damaged antenna comes into contact with your skin, a minor burn may result.
- ◇ Do not expose the radio to direct sunlight for a long time, nor place it close to a heating source.
- ◇ If you wear a portable radio on your body, ensure that the antenna is at least 2.5 centimeters (one inch) away from your body when transmitting.

# Radio Overview



① PTT (Push-to-Talk) Key	② SK1 (side key 1)	③ SK2 (side key 2)	④ Speaker
⑤ Microphone	⑥ Antenna	⑦ LED Indicator	⑧ Channel Selector Knob
⑨ Radio On-Off/Volume Control Knob	⑩ Battery Latch	⑪ Accessory Jack	⑫ Belt Clip
⑬ Battery	⑭ Screw for Belt Clip	⑮ Charging Piece	

## PTT (Push-to-Talk) Key

Press and hold down the **PTT** key to transmit, and release it to receive.

## SK1 and SK2

The side keys can be programmed with long/short press functions by your dealer.

Factory default settings are shown in the table below:

Name of Key	Operation	Function
SK1	Short press	None
	Long press	Battery strength indication
SK2	Short press	None
	Long press	Squelch Off Momentary

**Note:**

Short press: key press duration is shorter than 1.5 second;

Long press: key press duration is equal to or longer than 1.5 second.

**\* LED Indicator**

Status indications and alert tones are shown in the table below:

Wired Clone	Turn on the source radio with <b>PTT&amp;SK2</b> held down simultaneously. Turn on the target radio directly.	Orange LED flashes once.
	After the target radio is turned on and the cloning cable is connected, press <b>SK2</b> of the source radio to begin cloning.	LED flashes red during cloning process; LED goes out once the cloning succeeds; LED goes out once the cloning fails.
	Target radio	LED flashes green during the cloning process; LED goes out once cloning is completed.
Power on in User Mode		When the radio is turned on, it sounds the power-on alert. When the radio is currently on a blank channel, it sounds beep tone continuously.
Low Battery Alert		LED flashes red, and a low-pitched tone sounds every 10 seconds.

Transmitting	<p>Red LED glows.</p> <p>When TOT timer expires, the radio sounds beep tone continuously.</p> <p>A TOT pre-alert tone sounds before the TOT timer expires.</p>
Receive	LED glows green when carrier is present.
Scan	<p>Green LED flashes once every 1 second, while scanning is in process.</p> <p>Scan Start Alert (enabled/disabled by your dealer): a beep is heard.</p> <p>Scan End Alert (enabled/disabled by your dealer): a beep is heard.</p> <p>Priopriety Scan Alert (enabled/disabled by your dealer): one beep is heard if the radio is currently on a priority channel.</p>
Writing/Reading	<p>LED flashes red during reading.</p> <p>LED flashes green during writing.</p>
Adjust Power Level	<p>A low-pitched tone is heard when the radio switches from high power to low power.</p> <p>A high-pitched tone is heard when the radio switches from low power to high power.</p>
VOX	<p>A high-pitched tone is heard when the VOX function is enabled.</p> <p>A high-pitched tone is heard when the VOX function is disabled.</p>
Encoding HDC1200 PTT ID	<p>Red LED glows.</p> <p>The radio sounds beep tone continuously when encoding.</p> <p>A short beep is heard when encoding is complete.</p>
Decoding 2-Tone	When 2-Tone signaling is decoded successfully, the radio flashes orange LED and sounds alert tone.

**Channel Selector Knob**

Rotate the knob to select your desired channel.

**Radio On-Off/Volume Control Knob**

Rotate the knob to turn the radio on/off, and to adjust the volume.

**Battery Latch**

Used to secure the battery.

**Accessory Jack**

Used to connect audio accessories and programming accessories. When programming cable is connected, you can program the radio or upgrade firmware through the programming software.

## **Software Specifications**

### **Description of Features**

1. Channel Capacity: 16
2. Channel Spacing: 25KHz/12.5KHz
3. Channel Step: 5/6.25/10/12.5KHz
4. Channel Scan
5. Rx/Tx status indication (red/green LED)
6. CTCSS/CDCSS Encode & Decode (38 groups of standard CTCSS; 83 groups of standard CDCSS; CTCSS Tail Revert of 180/120 degrees, and supporting non-standard CTCSS/CDCSS).
7. Low Battery Alert
8. Battery Save
9. Unlock Detection and Emergency Alarm
10. 9 Selectable Squelch Levels
11. Monitor
12. Time-out Timer (TOT)
13. Squelch Tail Elimination
14. PC Programming (PC manual/ automatic tuning)
15. High/Low Power Switch (2.0/5.0W)
16. Wide & Narrow Bandwidth Compatible
17. Busy Channel Lockout (transmission prohibited in busy status)
18. Wired Clone
19. Battery Strength Indicator
20. Manual Adjustment
21. VOX and 5 Selectable Sensitivity Levels
22. ATIS (available to HDC1200 model only)
23. HDC1200 PTT ID (encode) (available to HDC1200 model only)
24. DOS (Data Operated Squelch) (available to HDC1200 model only)
25. 2-Tone Encode & Decode (available to 2-Tone model only)
26. Channel Lock (available to HDC1200 model only)



## Description of Modes

### User Mode

It is a conventional communication mode. After the radio is turned on, it enters the User Mode.

### PC Programming Mode

The radio can enter PC Programming Mode through specific protocol based communication with the programming software. In this mode, radio functions and adjustment parameters can be set through programming software (including User Version and Factory Version).

### Wired Clone Mode

#### 1. Description

Wired Clone Mode is an independent mode. To access other modes, you must restart the radio.

Wired Clone Mode includes User Clone Mode and Factory Clone Mode.

##### (1) User Clone Mode:

Connect two radios using a cloning cable. Then turn on the source radio with **SK2** held down, and the radio enters User Clone Mode in 2 seconds. The target radio can be directly turned on to enter the mode.

In this mode, data stored in EEPROM of the source radio will be cloned to EEPROM of the target radio. The data transferred only covers channel data and common parameters, excluding adjustment data, version and serial No. of the model.

##### (2) Factory Clone Mode:

Short the SELF pin of the source radio MCU, and connect the two radios using a cloning cable. Then turn on the source radio with **SK2** held down, and the radio enters Factory Clone Mode in 2 seconds. The target radio can be directly turned on to enter user mode. Data transferred covers all data in EEPROM other than the Serial No., with the Tuning Switch flag included.

#### 2. Process

Process of Wired Clone:

(1) Orange LED flashes once after the source radio enters Wired Clone Mode. Press **SK2** again to clone data to the target radio.

(2) During cloning, LED on the source radio flashes red, and LED on the target radio flashes green. After cloning ends, LED of both radios will go out, indicating both radios are ready for another cloning operation.

(3) If any abnormal situation occurs during cloning, the source radio will stop cloning and its LED will go out, indicating both radios are ready for another cloning operation.

(4) When cloning ends, the source radio goes back to the standby status. Press **SK2** again to begin another cloning operation.

### **Manual Adjust Mode**

Turn on the radio with **PTT** and **SK2** held down to enter Manual Adjust Mode.

Note: This operation is subject to the option Panel Test Mode in the programming software. When this option is unchecked, the radio is unable to enter the adjustment mode, which helps avoid change of parameters and degradation of radio performance caused by user's misoperations.

Keep this option unchecked after values are well adjusted from factory, to avoid any unexpected change of values. The adjustment values can be reset and changed in Factory Mode only.

Description of adjustment:

#### **1) To enter Manual Adjust Mode**

Turn on the radio with **PTT** and **SK2** held down for above 2 seconds. Then the LED glows orange to indicate that the radio enters Adjustment Mode.

When the keys are released, the radio will enter item N of Tx group (N depends on the position where the **Channel Selector Knob** locates). The radio enters an item of Tx group by default, and the LED glows red. (CH16 is used to switch between Tx group items and Rx group items. When the **Channel Selector Knob** locates at channel 16, there is no LED indication.)

#### **2) To switch between Tx group and Rx group**

Turn the **Channel Selector Knob** to channel 16, and then long press **PTT** to switch between Tx group and Rx group. Red LED glows when Tx group is selected, and green LED glows when Rx group is selected.

#### **3) To switch between items of Tx group/Rx group**

This operation is done through the **Channel Selector Knob**.

Tx group: CH1~Ch14 respectively represent Tx Preset Power, Tx Low Power, Tx Medium Power, Tx High Power, CDCSS Deviation, CTCSS Deviation (low), CTCSS Deviation (medium), CTCSS Deviation (high), MSK Deviation, VOX Level 1, VOX Level 2, VOX Level 3, VOX Level 4, VOX Level 5 and Tx Low Voltage Threshold. Note: MSK Deviation is available to HDC1200 model only.

The LED solidly glows red during adjustment of CH1-CH15.

Rx group: CH1~CH8 respectively stand for SQL On 1, SQL On 5, SQL On 9, SQL Off 1, SQL Off 5, SQL Off 9, Rx Low Voltage Threshold and Rx Bandpass Filter.

The LED solidly glows green during adjustment of CH1-CH8.

CH9~CH15 are invalid, and the green LED goes out when the **Channel Selector Knob** locates on one of these channels.

#### **4) To switch between wide and narrow bandwidth**

When adjusting a certain item, long press **PTT** (release the key after orange LED flashes) to switch between wide/narrow bandwidth. And the first frequency of the current bandwidth is the frequency for adjustment by default.

#### **5) To switch frequency**

Short press **PTT** (orange LED flashes indicating valid press) to switch between frequencies orderly under certain bandwidth and certain adjustment item.

#### **6) To add/subtract adjustment value**

Short press **SK1** under certain bandwidth and certain adjustment item to increase the adjustment value in steps of 1; hold down the key to increase the value continuously in steps of 1. The adjustment value will remain unchanged once it reaches the allowed maximum value.

Short press **SK2** under certain bandwidth and certain adjustment item to decrease the adjustment value in steps of 1; hold down the key to decrease the value continuously in steps of 1. The adjustment value will remain unchanged once it reaches the allowed minimum value.

#### **7) Measures on special items:**

Tx group: CH10~CH15 respectively stand for VOX Level 1, VOX Level 2, VOX Level 3, VOX Level 4, VOX Level 5 and Tx Low Voltage Threshold. These adjustment items are related to AD sampling. Press **SK1** or **SK2** after entering the above items, to activate AD sampling (including calculation) once. Rotate the **Channel Selector Knob** to save the current AD sampling value. If neither **SK1** nor **SK2** is pressed, the adjustment value will not be updated, and AD sampling will not be activated.

Rx group: CH1-CH7 respectively stand for SQL On 1, SQL On 5, SQL On 9, SQL Off 1, SQL Off 5, SQL Off 9 and Rx Low Voltage Threshold. These adjustment items are related to AD sampling. Press **SK1** or **SK2** after entering the above items, to activate AD sampling (including calculation) once. Rotate the

**Channel Selector Knob** to save the current AD sampling value. If neither **SK1** nor **SK2** is pressed, the adjustment value will not be updated, and AD sampling will not be activated.

**8) Description of key-press:**

Short press: key press duration is shorter than 1.5 second;

Long press: key press duration is equal to or longer than 1.5 second.

## Circuit Description

## 1. PLL Frequency Synthesizer

The PLL circuit mainly provides the local oscillator signal for Rx and RF carrier signal for Tx. It is composed of VCO and baseband processor, allowing frequency tracking and channel switching under the control of MCU signals.

1) PLL

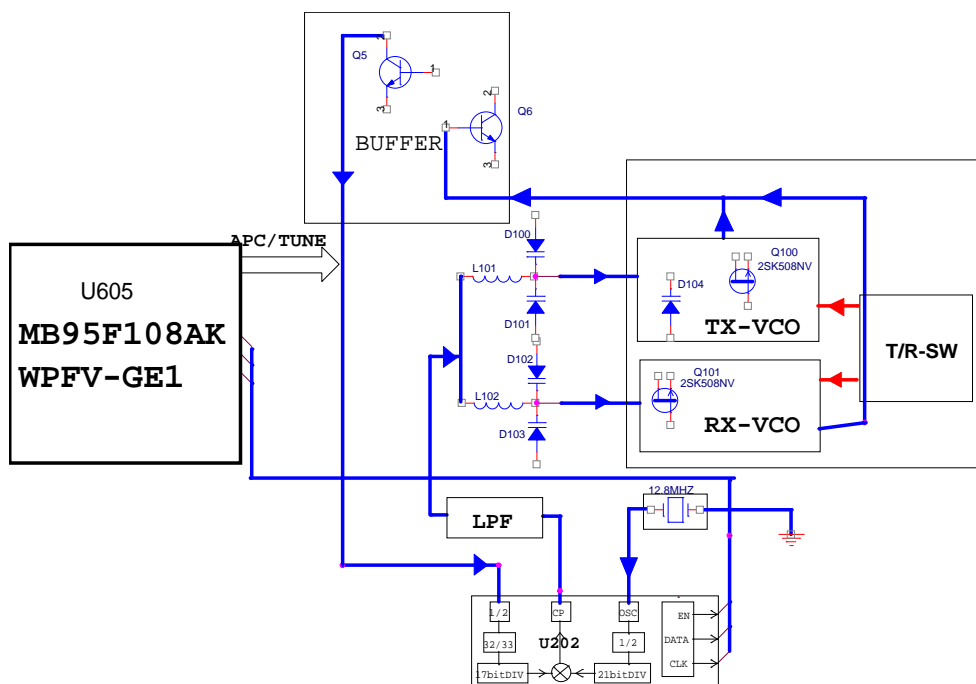


Figure 1

The step frequency of the PLL circuit is 5.0KHz, 6.25KHz, 10.0KHz or 12.5KHz (selectable). Therefore, the 38.4MHz reference oscillator signal is divided into 5.0KHz, 6.25 KHz, 10.0 KHz or 12.5 KHz reference frequencies via a fixed counter in the PLL (at U202). Meantime, the signal from the VCO goes through the buffer (Q102) and amplifier (Q103), and then it goes to the PLL (at U202), where it is divided by a variable frequency divider. In the phase detector (PD) of PLL, the new signal derived from frequency division is compared with the reference frequencies. After passing through a low-pass filter, the signal from the phase comparator goes to the varactors (D100, D101, D102 and D103) of VCO so as to control its output frequency.

## 2) VCO

The VCO section is realized by the oscillator circuit of three-point capacitance.

In Tx mode, the oscillator frequency of VCO is generated by Q100; in Rx mode, it is generated by Q101. U202 generates, via the phase comparator, a control voltage to control varactors (D100 and D101 in Tx mode; D102 and D103 in Rx mode), making the oscillator frequency of VCO be consistent with the preset frequency of MCU within a wide frequency range.

Q652 performs switching between transmission and reception under the control of T/R: in Tx mode, T/R is set to low level and Q653 is turned on, making Q100 operate; in Rx mode, T/R is set to high level and Q653 is cut off, making Q101 operate. The output from Q100 and Q101 is amplified by Q102 and then is fed to the buffer amplifier for further processing.

If the PLL is unlocked, the LD pin of U202 outputs low level. If the microprocessor detects such situation, Tx/Rx operation is prohibited, and an alarm sounds.

## 2. RF Power Amplifier Circuit (Tx Section)

The block diagram of the RF power amplifier circuit is shown in the figure below:

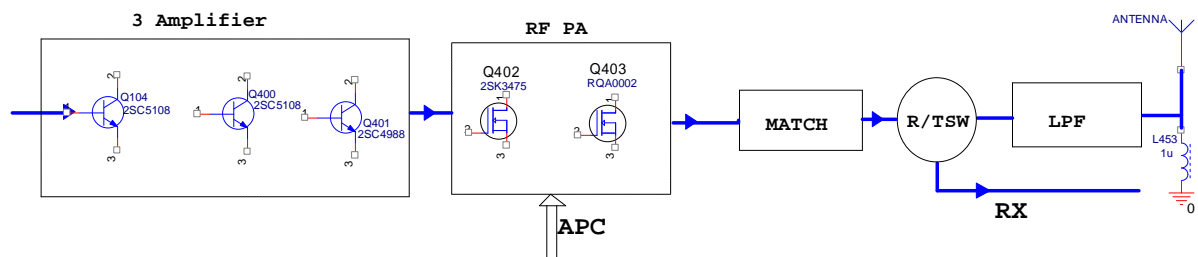


Figure 2

To obtain the required RF power, the RF signal from VCO goes to the buffer Q104 and to the driver amplifiers Q400 and Q401. Then the amplified RF signal goes to the driver Q402, which pre-amplifies power of the input signal to drive the final-stage power amplifier Q403. The input RF signal is then further amplified by Q403, and goes to the LC low-pass filter (LPF) through the Tx/Rx switching diode D401. Finally, it is transmitted from the antenna after high-order harmonics are removed by LPF.

## 3. Rx LNA and Mixer Circuit (Rx Section)

### 1) Rx LNA and RF BPF

To allow better frequency range selectivity, the Rx bandpass filter adopts the multi-stage electrically tunable circuit, as shown in Figure 3.

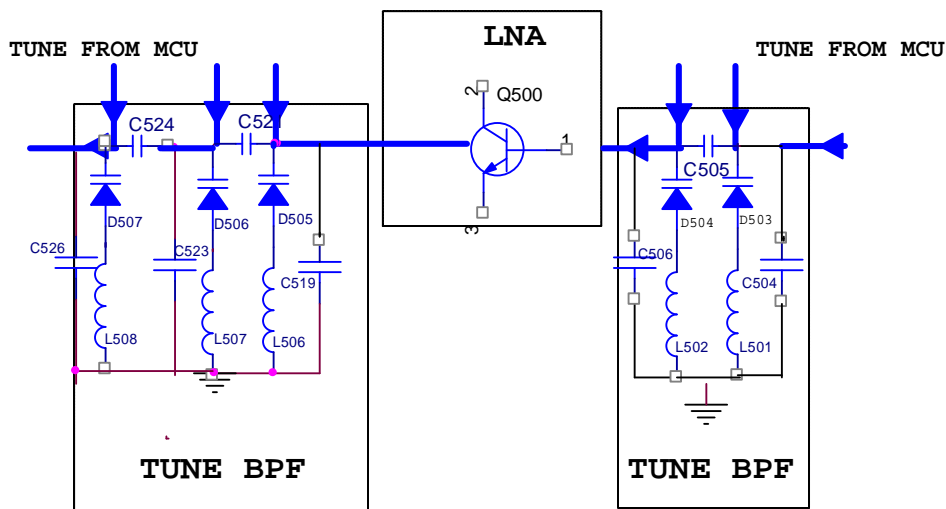


Figure 3

After out-of-band signals are removed by the electrically tunable bandpass circuit (D503, D504, L501, L502, C503, C505 and C507), the signals from the antenna go to the low-noise amplifier (LNA) Q500 for amplification. Then the amplified signals go to the three-stage bandpass circuit (mainly composed of D505, D506, D507 and peripheral components) to effectively eliminate out-of-band interference and to obtain pure RF signals. Finally, the signals go to the mixer circuit.

MCU provides the electrically tunable control signal (its level can be obtained via table lookup or calculation), making the varactor operate within an appropriate voltage range. It forms a bandpass filter with the peripheral inductors/capacitors. The capacitance of the varactor changes as the control voltage of MCU, to satisfy the requirements of preset Rx sensitivity and out-of-band rejection.

## 2) Mixer Circuit and BPF Circuit

The block diagram of the mixer circuit is shown in the figure below:

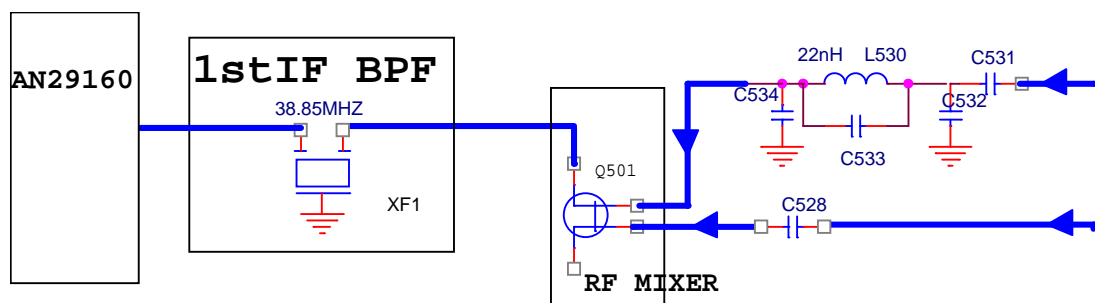


Figure 4

The mixer circuit mainly mixes the local oscillator signal from VCO with the received RF signal, to provide the first IF signal for frequency discrimination by the demodulator chip (active mixer is applied). The mixer Q501 uses a dual-gate MOSFET (3SK318), and is characterized by good noise characteristic, square-law characteristic, and high isolation degree between the first local oscillator signal and the Rx signal. In addition, it also has a gain value (adjustable via offset), so as to assure sufficient sensitivity. After residual spurious signals are removed by the inductor L509, the signals from the mixer go to the first IF filter (first-class crystal filter assuring sufficient bandwidth and good selectivity). Then the signals go to the baseband processor chip (AN29160) for demodulation.

#### 4. APC/TUNE Circuit

The block diagram of the APC/TUNE circuit is shown in the figure below:

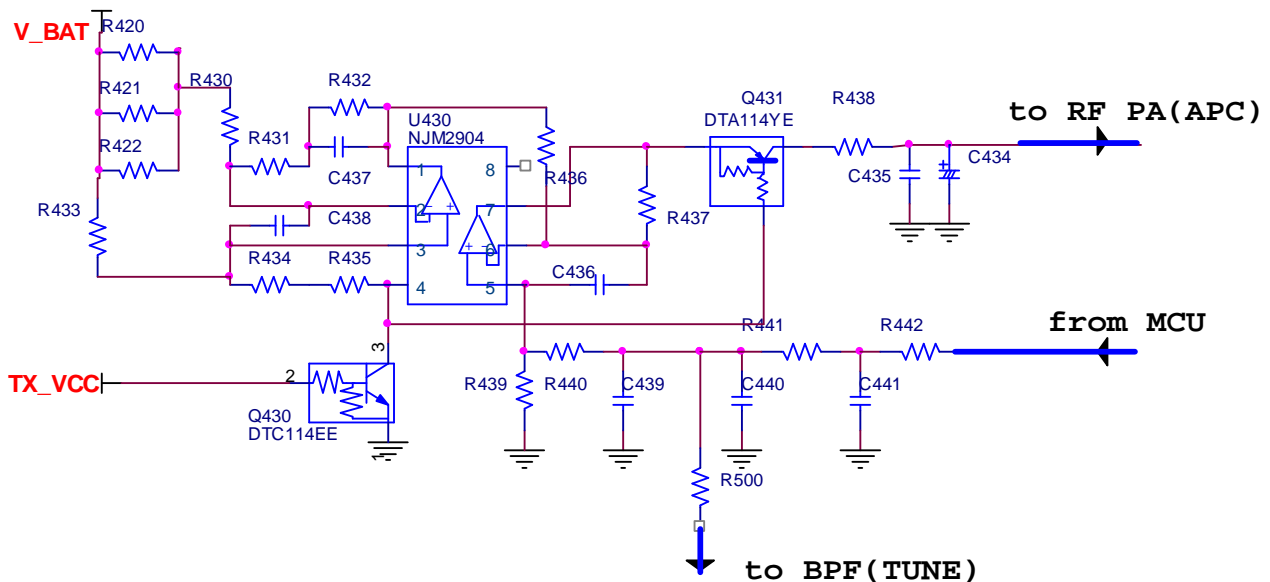


Figure 5

MCU outputs appropriate PWM waveform according to the selected channel. The waveform is then rectified by the RC filter circuit (R441, R442, C440 and C441) to generate level of APC/TUNE control signal. One flow of the signal goes to R500 to be used as control voltage of the Rx electrically tunable circuit. In Tx mode, the signal goes to R439 and R440 for voltage division, and the APC reference voltage is derived.



The error detect voltage is derived after the Tx current goes through R420, R421 and R422. Then the voltage is compared and amplified by the operational amplifier U430, and further compared with the APC reference voltage. After these operations, the APC control voltage is output, and the close-loop negative feedback control power is generated when the Tx current changes.

## 5. Audio and Signaling Processing Circuit

The baseband processor (AN29160) is highly integrated and has multiple functions such as VOX Level Detect & Output, SQ Level Detect & Output, Rx/Tx Audio Process & Convert, Audio Amplify, etc. In addition, it can be used for both transmission and reception.

### 1) Block diagram of Tx audio and signaling processing:

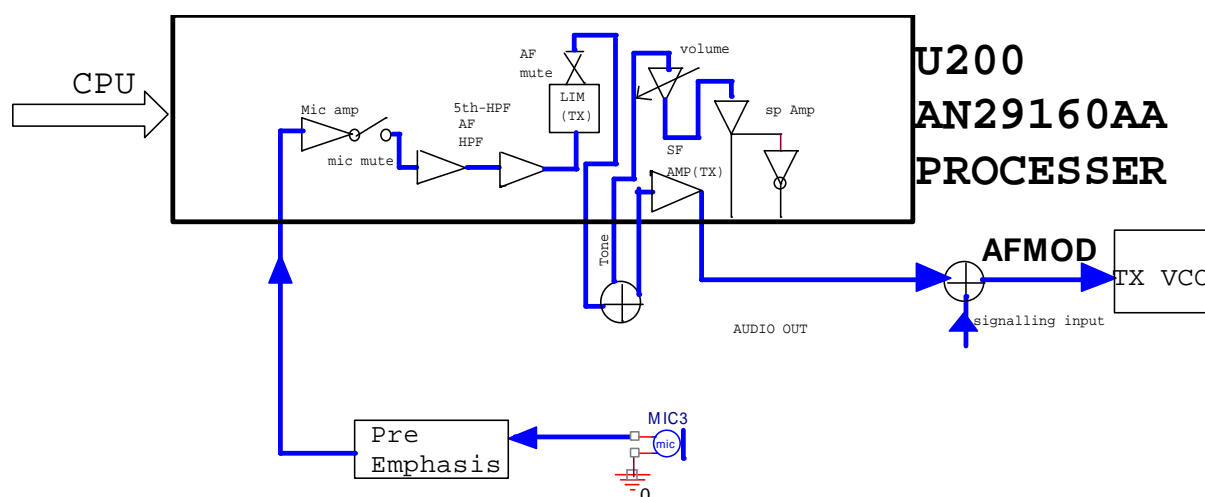


Figure 6

- Tx audio processing:** The audio signal from MIC is converted to electrical signal via acoustoelectric conversion of MIC. After pre-emphasized, the audio signal is processed by a limiting amplifier (at U200). Then the processed signal goes to the low-pass filter circuit to remove frequencies over 3KHz. Finally, the signal goes to the potentiometer (VR200) and then to VCO for direct frequency modulation.
- Tx signaling processing:** MCU outputs, via the QTO port, signaling code waveform, which is divided via RC circuit into two flows. One flow modulates the reference frequency oscillator of PLL directly, while the other flow modulates VCO. Note: VR260 adjusts the amplitude proportion between the two flows, to optimize the singaling waveform modulated on the carrier.

## 2) Block diagram of Rx audio & signaling processing circuit

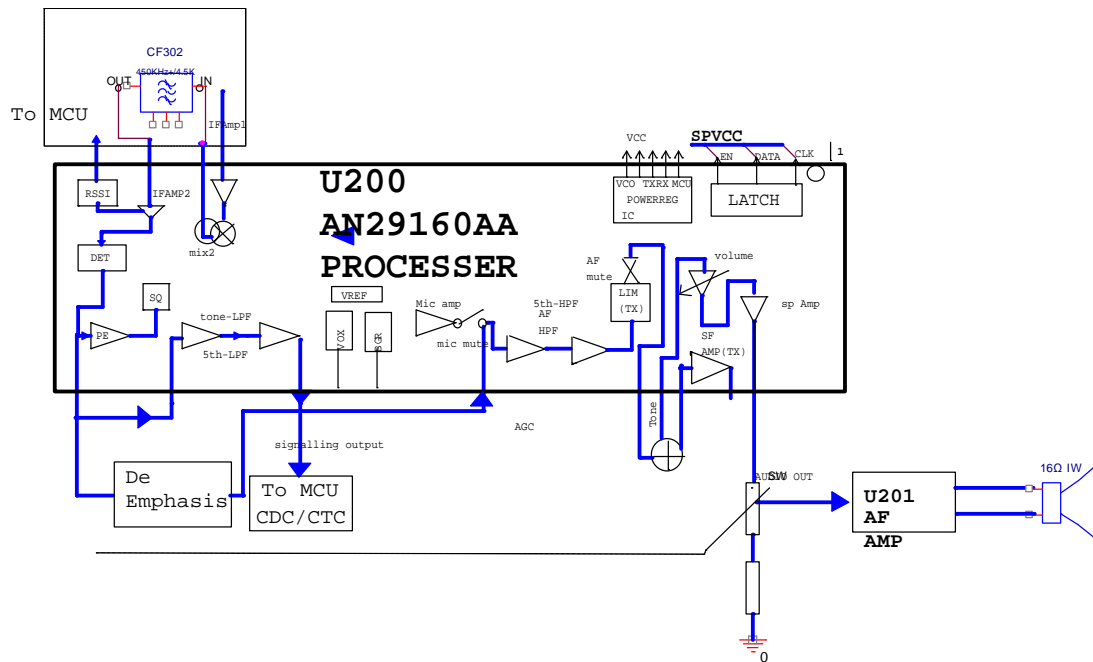


Figure 7

After demodulating the received signal, U200 outputs initial audio signal, which contains noise, signaling and voice components. Therefore, audio is processed via three flows.

- 1) Rx audio processing: One flow of audio signal from U200 goes back to U200 after passing through the RC low-pass filter and de-emphasis circuit. This flow of audio signal is amplified at U200, and restored after frequencies below 300Hz are removed. The restored audio signal is adjusted by the potentiometer and then fed to the audio power amplifier (U201), which performs power amplification to drive the speaker directly. To obtain higher power, BTL output is adopted.
- 2) Rx signaling processing: One flow of audio signal from U200 goes to the 300Hz low-pass filter circuit (U640). After audio signals above 300Hz are removed, signaling (CTCSS or CDCSS) goes to the QTIN pin of CPU. Then the input singaling is decoded by CPU.
- 3) Noise Signal Processing: One flow of audio signal from U200 goes back to U200. After they are filtered, amplified and rectified at U200, a DC voltage signal (SQ) is derived and is sent to the BUSY pin of MCU by the ND pin of U200. Then MCU processes the input signal.

## 6. MCU Control Circuit

The block diagram of the MCU control circuit is shown in the figure below. MCU operates on the clock frequency of 7.3728MHz.

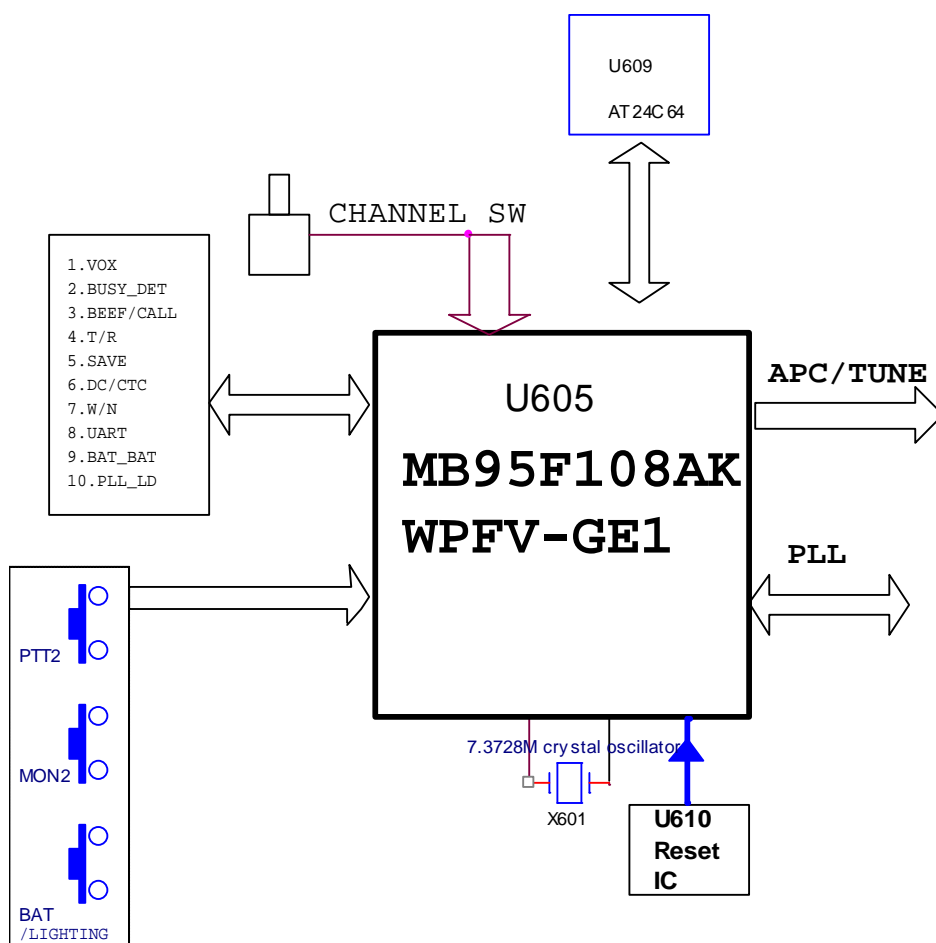


Figure 8

The MCU control circuit is mainly composed of MCU, EEPROM, restart IC, keys, knobs, etc. Main functions realized through this circuit are:

1) Signal Control:

- To control Battery Save Mode;
- To control high/low power switch;
- To control wide/narrow band switch;
- To control Tx/Rx switch;
- To control APC/TUNE output voltage;
- To control power supply of transmitter and audio amplifier;
- To control SQL open detection.

2) Signal Detect:

- To detect startup of external PTT, MONI and VOX;
- To detect PLL Unlock;

- To detect VOX ON level;
- To detect low voltage alarm;
- To detect and determine external earpiece.

### 3) Data Transmission and Processing:

- To initialize EEPROM data;
- To transfer programming data;
- To process the code of **Channel Selector Knob**.
- To encode and decode signaling;
- To transfer data of baseband processing chip (PLL).

## 7. Power Management Circuit

The block diagram is shown in the figure below:

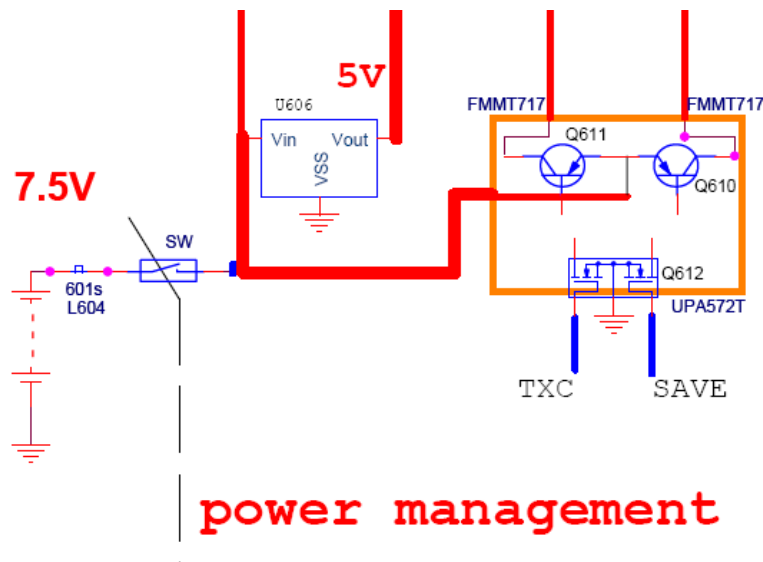


Figure 9

After power-on, one flow of battery voltage is filtered by L604 and C682, and then goes to the RF power amplifier and audio power amplifier for amplification. Another flow goes to the 5V regulator (U606). After regulated, the VCC\_5V voltage is output for use by MCU and baseband processing chip. As the radio operates at half-duplex mode, the Tx and Rx power supplies need to be controlled alternately. In addition, to meet requirements of battery save mode, MCU needs to output a pulse signal (SAVE control signal) with fixed duty ratio. If the SAVE control signal is at high level, Q610 becomes conductive and provides the 5V voltage (V\_SAVE) for the operating circuit (PLL and Rx circuit). If the SAVE control signal is a pulse signal, the radio will enter Battery Save Mode. During transmission, CPU control signal (TXC) is at

high level. Then Q611 becomes conductive and provides 5V voltage (TX\_VCC) for the operating circuit (Tx circuit).

The power supply of the Tx and Rx circuits are protected by symmetrical voltage regulation measures. When output voltage/current changes along with the change of load, the close-loop feedback circuit operates, regulating the output voltage to 5V.

## 8. VOX Realization Circuit

The block diagram is shown in the figure below:

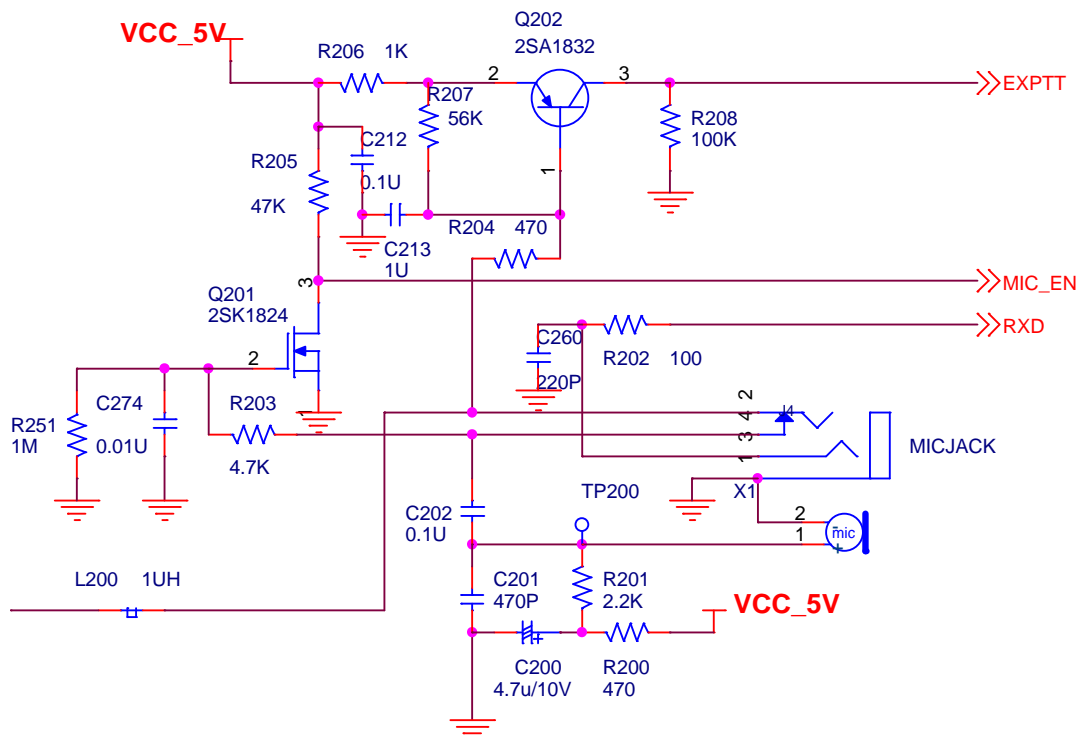


Figure 10

Press and hold down the programmed **VOX** key, and the radio enters the VOX status. The VOX can be activated only when MIC\_EN and EXT-PTT are detected by MCU to switch from low level to high level within several hundred milliseconds. Otherwise, the earpiece will be deemed as non-VOX one and the VOX function will not be activated.

- 1) When a VOX earpiece is plugged into the accessory jack, Q201 is cut off, and MIC\_EN switches from low level to high level. Meantime, Q202 and R204 form a closed circuit with the external earpiece (Q202 is conductive), and EXT-PTT switches from low level to high level. In this case, the VOX earpiece is determined by MCU, and the VOX function is enabled. When the VOX level

(5 selectable levels) gets to the preset value, transmission is initiated, and the voice signal enters the bansband processor (AN29160) via the processing path.

- 2) If it is a non-VOX earpiece (namely an earpiece with PTT), Q201 is cut off, and MIC\_EN switches from low level to high level. However, Q202 does not form a loop circuit (maintaining the cut-off status) and EXT-PTT is still at low level. In this case, a non-VOX earpiece is determined by MCU. The radio will return to normal mode, and will transmit if the **PTT** key on the earpiece is held down.

## CPU Pins

### 1. TC-610P (HDC1200 Ver.) CPU Pins

Pin No.	Port	Pin Name	I/O	Function
1	AVcc	Vcc		Power supply pin for A/D; connected to power supply.
2	AVR	Vcc		A/D reference input pin; connected to power supply.
3	PE3/INT13	PTT	I	PTT key (connected with external pull-up resistor) (valid at low level).
4	PE2/INT12	SK1	I	SK1 pin (connected with external pull-up resistor) (valid at low level)
5	PE1/INT11	EXT-PTT	I	Earpiece PTT input pin (connected with pull-down resistor) (valid at high level)
6	PE0/INT10	SK2	I	SK2 pin (connected with external pull-up resistor) (valid at low level)
7	P83	ENC3	I	Channel Selector Knob input pin (connected with pull-up resistor)
8	P82	ENC2	I	
9	P81	ENC1	I	
10	P80	ENC0	I	
11	P71/TI0	T/R	O	Tx/Rx switch pin H (R) / L (T)
12	P70/TO0	Reserved		
13	MOD	Download	I	An operating mode designation pin; when downloading, this pin is connected with VCC and external 47K resistor for ground Vss; in other situations, it is connected only with external 47K resistor for ground Vss.
14	X0	OSC0		For 7.3728MHz main crystal oscillator
15	X1	OSC1		
16	Vss	GND		Power supply (Ground) pin; when downloading, this pin is connected to Ground.
17	Vcc	VCC (5V)		5V power supply pin for MCU; when downloading, this pin is connected with VCC.
18	PG0	C (this pin is not for I/O use)		5V MCU; this pin is not for I/O use, and it must be connected with capacitor for ground Vss.

19	PG2/X1A	OSC32K		Secondary crystal oscillator pin (reserved)
20	PG1/X0A	OSC32K		
21	/RST	RESET	I	Reset pin (When downloading, this pin is connected to RSTX.)
22	P00/INT00	Reserved	O	
23	P01/INT01	Reserved	O	
24	P02/INT02	Reserved	O	
25	P03/INT03	Reserved	O	
26	P04/INT04	KB8825_PLL_EN	O	KB8825 PLL ENABLE
27	P05/INT05	KB8825_PLL_DATA	O	KB8825 PLL DATA
28	P06/INT06	KB8825_PLL_CLK	O	KB8825 PLL CLOCK
29	P07/INT07	KB8825_LD	I	KB8825 PLL unlock detect pin (H: Lock; L: unlock) (connected with external pull-up resistor)
30	P10/UI0	RXD	I	UART RX pin (When downloading, this pin is connected to UI.)
31	P11/UO0	TXD	O	UART TX pin (When downloading, this pin is connected to UO.)
32	P12/UCK0	Reserved	O	
33	P13/TRG0/ADTG	Reserved	O	
34	P14/PPG0	MIC_EN	I	Check MIC connection (connected with external pull-up resistor) (valid at high level)
35	P20/PPG00	CTC_DCS	PWM	CTCSS/CDCSS output pin
36	P21/PPG01	MSK	PWM	MSK input pin
37	P22/TO00	TONE	O	Beep tone / Call tone output pin
38	P23/TO01	W/N	O	Wide/narrow band control pin W (L) / N (H)
39	P24/EC0	VOX_TYPE	I	Determine earpiece type (H: plug type; L: contact pin) (connected with internal pull-up resistor)
40	P50/SCL0	SCL	SCL	EEPROM CLOCK
41	P51/SDA0	SDA	SDA	EEPROM DATA
42	P52/PPG1	AP/TU	PWM	APC / TUNE
43	P53/TRG1	TX_CTRL	O	Tx power supply control pin (H: valid, activate transmit)
44	P60/PPG10	AN29160_CLK	O	AN29160 CLOCK
45	P61/PPG11	AN29160_DATA	O	AN29160 DATA
46	P62/TO10	AN29160_EN	O	AN29160 ENABLE
47	P63/TO11	Reserved	O	
48	P64/EC1	Reserved	O	
49	P65/SCK	Reserved	O	



50	P66/SOT	Reserved	O	
51	P67/SIN	Self	I	Test pin (used for Factory Clone Mode, connected with external pull-up resistor)
52	P43/AN11	SPCNT	O	Main audio control pin (H: audio on)
53	P42/AN10	PCONT	O	A pin to control power supply of AN29160AA.
54	P41/AN09	RLED	O	Red LED
55	P40/AN08	GLED	O	Green LED
56	P37/AN07	Reserved	O	
57	P36/AN06	Reserve	O	
58	P35/AN05	TI	I/AD	CTCSS/CDCSS input pin
59	P34/AN04	BUSY	I/AD	Busy channel detect pin (10-bit AD required)
60	P33/AN03	BAT_DET	I/AD	Battery strength detect pin (10-bit AD required)
61	P32/AN02	Reserved	O	
62	P31/AN01	VOX_DET	I/AD	VOX detect pin (10-bit AD required)
63	P30/AN00	Reserved	O	
64	AVss	GND		Power supply (Ground) pin for A/D; connected to Ground.

## 2. TC-610P (2-Tone Ver.) CPU Pins

Pin No.	Port	Pin Name	I/O	Function
1	AVcc	Vcc		Power supply pin for A/D; connected to power supply.
2	AVR	Vcc		A/D reference input pin; connected to power supply.
3	PE3/INT13	PTT	I	PTT key (connected with external pull-up resistor) (valid at low level).
4	PE2/INT12	SK1	I	SK1 pin (connected with external pull-up resistor) (valid at low level)
5	PE1/INT11	EXT-PTT	I	Earpiece PTT input pin (connected with pull-down resistor) (valid at high level)
6	PE0/INT10	SK2	I	SK2 pin (connected with external pull-up resistor) (valid at low level)

7	P83	ENC3	I	Channel Selector Knob input pin (connected with pull-up resistor)
8	P82	ENC2	I	
9	P81	ENC1	I	
10	P80	ENC0	I	
11	P71/TI0	T/R	O	Tx/Rx switch pin H (R) / L (T)
12	P70/TO0	Reserved		
13	MOD	For download	I	An operating mode designation pin; when downloading, this pin is connected with VCC and external 47K resistor for ground Vss; in other situations, it is connected only with external 47K resistor for ground Vss.
14	X0	OSC0		For 7.3728MHz main crystal oscillator
15	X1	OSC1		
16	Vss	GND		Power supply (Ground) pin; when downloading, this pin is connected to Ground.
17	Vcc	VCC (5V)		5V power supply pin for MCU; when downloading, this pin is connected with VCC.
18	PG0	C (not for I/O use)		5V MCU; this pin is not for I/O use, and it must be connected with capacitor for ground Vss.
19	PG2/X1A	OSC32K		Secondary crystal oscillator pin (reserved)
20	PG1/X0A	OSC32K		
21	/RST	RESET	I	Reset pin (When downloading, this pin is connected to RSTX.)
22	P00/INT00	Reserved	O	
23	P01/INT01	Reserved	O	
24	P02/INT02	Reserved	O	
25	P03/INT03	Reserved	O	
26	P04/INT04	KB8825_PLL_EN	O	KB8825 PLL ENABLE
27	P05/INT05	KB8825_PLL_DATA	O	KB8825 PLL DATA
28	P06/INT06	KB8825_PLL_CLK	O	KB8825 PLL CLOCK
29	P07/INT07	KB8825_LD	I	KB8825 PLL unlock detect pin (H: Lock; L: unlock) (connected with external pull-up resistor)
30	P10/UI0	RXD	I	UART RX pin (When downloading, this pin is connected to UI.)
31	P11/UO0	TXD	O	UART TX (When downloading, this pin is connected to UO.)

32	P12/UCK0	Reserved	O	
33	P13/TRG0/ADTG	Reserved	O	
34	P14/PPG0	MIC_EN	I	Check MIC connection (connected with external pull-up resistor) (valid at high level)
35	P20/PPG00	CTC_DCS	PWM	CTCSS/CDCSS output pin
36	P21/PPG01	Reserved	PWM	Reserved
37	P22/TO00	TONE	O	Beep tone / Call tone output pin
38	P23/TO01	W/N	O	Wide/narrow band control pin W (L) / N (H)
39	P24/EC0	TTS_IN	I	2-Tone input pin
40	P50/SCL0	SCL	SCL	EEPROM CLOCK
41	P51/SDA0	SDA	SDA	EEPROM DATA
42	P52/PPG1	AP/TU	PWM	APC / TUNE
43	P53/TRG1	TX_CTRL	O	Tx power supply control pin (H: valid, activate transmit)
44	P60/PPG10	AN29160_CLK	O	AN29160 CLOCK
45	P61/PPG11	AN29160_DATA	O	AN29160 DATA
46	P62/TO10	AN29160_EN	O	AN29160 ENABLE
47	P63/TO11	Reserved	O	
48	P64/EC1	Reserved	O	
49	P65/SCK	Reserved	O	
50	P66/SOT	Reserved	O	
51	P67/SIN	Self	I	Test pin (used for Factory Clone Mode, connected with external pull-up resistor)
52	P43/AN11	SPCNT	O	Main audio control pin (H: audio on)
53	P42/AN10	PCONT	O	A pin to control power supply of AN29160AA.
54	P41/AN09	RLED	O	Red LED
55	P40/AN08	GLED	O	Green LED
56	P37/AN07	MOT_CNT	O	MOT_CNT motor control output pin. H: activate motor; L: disable motor.
57	P36/AN06	Reserved	O	
58	P35/AN05	TI	I/AD	CTCSS/CDCSS input pin
59	P34/AN04	BUSY	I/AD	Busy channel detect pin (10-bit AD required)
60	P33/AN03	BAT_DET	I/AD	Battery strength detect pin (10-bit AD required)
61	P32/AN02	Reserved	O	
62	P31/AN01	VOX_DET	I/AD	VOX detect pin (10-bit AD required)
63	P30/AN00	Reserved	O	
64	AVss	GND		Power supply (Ground) pin for A/D; connected to Ground.

## TC-610P Parts List 1

### TC-610P VHF (HDC1200) Parts List 1

TC-610P VHF Parts List 1 (136-174MHz)					
No.	Material No.	Description	Qty.	Ref No.	Print No.
1	3001050000000	Chip resistor 0402 0Ω J 1/16W(RoHS)	17	C222	T2K
				R103	T4I
				R117	T5H
				R234	T4K
				R244	B1E
				R307	T5J
				R308	T4J
				R317	T3I
				R510	T2G
				R704	T3K
				R711	T3K
				R713	B1C
				R714	B1C
				R715	B2C
				R716	B2C
				R719	B4K
				R721	T2K
2	3001051000000	Chip resistor 0402 10Ω J 1/16W(RoHS)	1	R355	B2D
3	3001051000020	Chip resistor 0402 10Ω F 1/16W(RoHS)	3	R116	T3G
				R241	B3K
				R243	B2A
4	3001051010040	Chip resistor 0402 100Ω F 1/16W(RoHS)	7	R540	T2G
				R653	T4G
				R654	T4G
				R660	B5J
				R670	B5K
				R697	B4J
				R698	B4J
5	3001051020000	Chip resistor 0402 1KΩ F 1/16W(RoHS)	16	R102	T4I
				R108	T4G
				R110	T3G
				R309	T3I
				R310	T4J
				R640	B3A
				R643	T2E
				R644	B3I
				R649	T2D
				R650	T4G
				R657	B3I

				R658	B3J
				R662	B3B
				R665	B3A
				R666	B3B
				R694	B3J
6	3001051020010	Chip resistor 0402 1KΩ J 1/16W(RoHS)	2	R350	B1C
				R352	B2C
7	3001051030000	Chip resistor 0402 10KΩ J 1/16W(RoHS)	18	R351	B1D
				R104	T5I
				R112	T3G
				R212	T2J
				R213	T1K
				R300	T3J
				R301	T3J
				R302	T3J
				R354	B1E
				R359	B2F
				R360	B1E
				R400	T3F
				R436	B4C
				R504	T3F
				R530	T3F
				R695	B3J
				R696	B3J
				R717	B4K
8	3001051040000	Chip resistor 0402 100KΩ F 1/16W(RoHS)	15	R267	T4H
				R311	T2I
				R501	T3D
				R502	T3D
				R507	T2F
				R508	T2F
				R512	T2G
				R514	T2G
				R645	B4I
				R646	B4I
				R647	B3I
				R652	T4G
				R655	B3J
				R708	T3K
				R709	T3K
9	3001051050000	Chip resistor 0402 1MΩ F 1/16W(RoHS)	3	R437	B4D
				R500	T2F
				R667	B4I
10	3001051230000	Chip resistor 0402 12KΩ J 1/16W(RoHS)	7	R222	T2K
				R239	T4K

				R313	T3I
				R314	T3J
				R315	T3J
				R345	B1D
				R353	B1E
11	3001051240000	Chip resistor 0402 120KΩ J 1/16W(RoHS)	2	R109	T3G
				R229	T4K
12	3001051520000	Chip resistor 0402 1.5KΩ J 1/16W(RoHS)	1	R101	T4I
13	3001051520010	Chip resistor 0402 1.5KΩ F 1/16W(RoHS)	1	R515	T2G
14	3001051540000	Chip resistor 0402 150KΩ F 1/16W(RoHS)	9	R107	T4G
				R225	T2K
				R306	T5J
				R430	B4C
				R431	B4C
				R432	B4C
				R433	B4C
				R434	B4C
				R435	B4C
15	3001051830000	Chip resistor 0402 18KΩ J 1/16W(RoHS)	2	R224	T2K
				R233	T4K
16	3001051840000	Chip resistor 0402 180KΩ J 1/16W(RoHS)	3	R316	T3I
				R511	T2G
				R513	T2G
17	3001051850000	Chip resistor 0402 1.8MΩ J 1/16W(RoHS)	2	R228	T3K
				R440	B1D
18	3001052200010	Chip resistor 0402 22Ω F 1/16W(RoHS)	2	R401	T4F
				R406	T5F
19	3001052210000	Chip resistor 0402 220Ω J 1/16W(RoHS)	1	R710	T3K
20	3001052220000	Chip resistor 0402 2.2KΩ J 1/16W(RoHS)	2	R235	T4K
				R438	B4D
21	3001052230010	Chip resistor 0402 22KΩ J 1/16W(RoHS)	4	R214	T2K
				R221	T2K
				R356	B2E
				R505	T3E
22	3001052720000	Chip resistor 0402 2.7KΩ J 1/16W(RoHS)	3	R520	T2I
				R659	T2E
				R663	T2D
23	3001052730010	Chip resistor 0402 27KΩ F 1/16W(RoHS)	1	R216	T2K
24	3001052790000	Chip resistor 0402 2.7Ω J 1/16W(RoHS)	1	R521	T3E
25	3001053030000	Chip resistor 0402 30KΩ F 1/16W(RoHS)	1	R218	T2K
26	3001053310010	Chip resistor 0402 330Ω J 1/16W(RoHS)	6	R114	T3G
				R403	T4F
				R407	T4F
				R516	T2G
				R656	B4A

				R689	B4A
27	3001053320000	Chip resistor 0402 3.3KΩ J 1/16W(RoHS)	10	R111	T3G
				R113	T3G
				R115	T3F
				R230	T3K
				R236	T4K
				R263	B4H
				R312	B1I
				R506	T3E
				R639	T2D
				R664	T2D
28	3001053340000	Chip resistor 0402 330KΩ J 1/16W(RoHS)	3	R266	T4H
				R439	B4D
				R702	B5J
29	3001053630000	Chip resistor 0402 36KΩ J 1/16W(RoHS)	1	R226	T2K
30	3001053940000	Chip resistor 0402 390KΩ J 1/16W(RoHS)	2	R223	T2K
				R227	T2K
31	3001054700000	Chip resistor 0402 47Ω J 1/16W(RoHS)	2	R410	T5F
				R415	T5E
32	3001054710000	Chip resistor 0402 470Ω J 1/16W(RoHS)	1	R358	B2F
33	3001054720000	Chip resistor 0402 4.7KΩ J 1/16W(RoHS)	10	R231	T3K
				R242	B3K
				R273	B4J
				R274	B4K
				R412	T5F
				R441	B4J
				R442	B4J
				R651	T5G
				R700	B4J
				R701	B4K
34	3001054730000	Chip resistor 0402 47KΩ J 1/16W(RoHS)	19	R703	T2D
				R237	T4K
				R238	T4K
				R260	B4I
				R262	B4H
				R268	T5H
				R304	T4J
				R305	T4J
				R402	T4F
				R417	T5E
				R636	B4I
				R637	B4I
				R638	B4I
				R641	B4I
				R668	B4J

				R690	B5J
				R692	T1E
				R693	B5I
				R712	B4I
35	3001054740000	Chip resistor 0402 470KΩ J 1/16W(RoHS)	3	R211	T3J
				R642	B2I
				R648	B3I
36	3001055610000	Chip resistor 0402 560Ω J 1/16W(RoHS)	3	R100	T4I
				R517	T2H
				R518	T2I
37	3001055630000	Chip resistor 0402 56KΩ J 1/16W(RoHS)	2	R219	T2K
				R411	T5F
38	3001055640000	Chip resistor 0402 560KΩ J 1/16W(RoHS)	1	R519	T2I
39	3001056810000	Chip resistor 0402 680Ω J 1/16W(RoHS)	2	R405	T5F
				R503	T3F
40	3001056830000	Chip resistor 0402 68KΩ J 1/16W(RoHS)	1	R118	T4H
41	3001058210000	Chip resistor 0402 820Ω J 1/16W(RoHS)	1	R661	T2D
42	3001058230000	Chip resistor 0402 82KΩ J 1/16W(RoHS)	1	R264	B4H
43	3001058240000	Chip resistor 0402 820KΩ F 1/16W(RoHS)	6	R232	T3K
				R240	T4K
				R346	B1E
				R347	B1D
				R706	T3K
				R707	T3K
44	3001062710000	Chip resistor 0603 270Ω J 1/10W(RoHS)	1	R419	B5C
45	3001070000000	Chip resistor 0805 0Ω J 1/8W(RoHS)	2	L405	T5E
				L455	T5B
46	3005051020010	Integrated resistor 1K J 1/16W (RoHS)	1	RN1	T4J
47	3099080398000	Chip resistor 1206 0.39Ω J 1/4W(RoHS)	3	R420	B4C
				R421	B4C
				R422	B4C
48	3101050200010	Chip capacitor 2PF B 50V C0G 0402 (RoHS)	3	C501	T3D
				C560	T2H
				C561	T2H
49	3101050300000	Chip capacitor 0402 3PF B 50V (RoHS)	1	C500	T4C
50	3101050400010	Chip capacitor 0402 4PF B 50V (RoHS)	2	C532	T3F
				C534	T2F
51	3101050800000	Chip capacitor 0402 8PF B 50V (RoHS)	3	C524	T2F
				C645	B5I
				C691	B4I
52	3101051000020	Chip capacitor 10PF J 50V C0G 0402 (RoHS)	8	C121	T3H
				C132	T3G
				C137	T3H
				C321	T5I
				C322	T5I



				C449	B5E
				C505	T3D
				C541	T2G
53	3101051010030	Chip capacitor 100PF J 50V C0G 0402 (RoHS)	21	C107	T5I
				C266	B4H
				C303	T3J
				C304	T3J
				C305	T3J
				C334	B1I
				C351	B1C
				C352	B1C
				C353	B1C
				C354	B2D
				C357	B1D
				C358	B2D
				C359	B2C
				C362	B2C
				C503	T3D
				C506	T3E
				C518	T3F
				C520	T2F
				C531	T3F
				C535	T2F
				C669	T4J
54	3101051020010	Chip capacitor 1000PF K 50V X7R 0402 (RoHS)	33	C658	T1D
				C684	T2D
				C106	T4H
				C204	T3K
				C265	T4H
				C320	T5I
				C323	T5I
				C341	T3I
				C348	B1D
				C400	T3F
				C403	T5F
				C405	T5F
				C408	T5F
				C414	T5E
				C439	B4D
				C502	T3D
				C509	T3D
				C514	T3E
				C609	B3I
				C641	B4B
				C644	B4B

				C646	T2D
				C651	T4G
				C653	T5G
				C657	T2D
				C661	T1D
				C666	B3A
				C667	B4A
				C670	B5I
				C680	B3I
				C685	B5J
				C686	B2I
				C689	B4I
55	3101051030020	Chip capacitor 0.01UF K 25V X7R 0402 (RoHS)	21	C105	T4H
				C237	T3K
				C276	B4K
				C277	B4K
				C300	T3I
				C311	B3I
				C345	B2D
				C416	T4D
				C419	B4C
				C517	T3F
				C527	T2F
				C528	T2F
				C529	T2G
				C540	T1G
				C542	T2H
				C546	T2I
				C547	T2I
				C656	B4K
				C662	T2D
				C677	T1E
				C681	B3I
56	3101051040060	Chip capacitor 0.1UF K 16V X7R 0402 (RoHS)	32	C1	B5I
				C118	T4G
				C127	T3G
				C143	T3G
				C205	T3K
				C217	T2K
				C231	B2J
				C240	T4K
				C249	T2B
				C253	T4J
				C315	T4J
				C324	T2I

				C325	T2I
				C326	T2J
				C329	T2J
				C330	T2I
				C331	T2I
				C332	T2I
				C333	B1I
				C346	B1D
				C347	B1D
				C415	T4D
				C418	B4C
				C420	T4E
				C433	B4D
				C511	T3F
				C537	T2G
				C642	B3J
				C650	T4G
				C655	T5G
				C683	B2I
				C687	B5I
57	3101051050000	Chip capacitor 1UF K 6.3V X5R 0402 (RoHS)	18	C216	T1K
				C218	T2J
				C226	T2K
				C230	B2J
				C241	T4K
				C242	T4K
				C301	T3I
				C306	T3I
				C307	T3I
				C309	T3I
				C310	B3I
				C440	B4J
				C441	B4K
				C448	B5E
				C678	B4K
				C690	B3I
				C693	T3K
				R275	B4H
58	3101051200020	Chip capacitor 0402 12PF J 50V (RoHS)	5	C407	T5E
				C508	T3E
				C521	T3F
				C533	T3F
				C544	T2H
59	3101051500020	Chip capacitor 15PF J 50V COG 0402 (RoHS)	7	C111	T5H
				C133	T3G

				C135	T3H
				C413	T4F
				C507	T3E
				C522	T2F
				C523	T2F
60	3101051520000	Chip capacitor 1500PF K 50V X7R 0402 (RoHS)	1	C224	T2J
61	3101051830000	Chip capacitor 0402 0.018UF K 16V(RoHS)	2	C207	T3K
				C248	B1E
62	3101052200010	Chip capacitor 22PF J 50V C0G 0402 (RoHS)	3	C136	T3H
				C138	T3H
				C245	T4K
63	3101052210010	Chip capacitor 220PF K 50V X7R 0402 (RoHS)	2	C412	T5E
				C510	T3E
64	3101052220010	Chip capacitor 2200pF K 50V X7R 0402 (RoHS)	1	C258	T4K
65	3101052230000	Chip capacitor 0402 0.022UF K 16V(RoHS)	2	C215	T1K
				C663	B4K
66	3101052700000	Chip capacitor 27PF J 50V C0G 0402 (RoHS)	3	C141	T3G
				C504	T4D
				C519	T3F
67	3101053300000	Chip capacitor 33PF J 50V C0G 0402 (RoHS)	3	C120	T3H
				C130	T3G
				C515	T3E
68	3101053910000	Chip capacitor 0402 390PF J 50V(RoHS)	2	C228	T2J
				C234	T3K
69	3101053920000	Chip capacitor 0402 3900PF K 25V(RoHS)	1	C679	B4K
70	3101054700010	Chip capacitor 47PF J 50V COG 0402 (RoHS)	1	C280	B1A
71	3101054710010	Chip capacitor 0402 470PF K 50V (RoHS)	37	C117	T4G
				C126	T3G
				C131	T4G
				C134	T3G
				C139	T3H
				C140	T3G
				C142	T3G
				C267	T2B
				C316	T4J
				C335	T4I
				C337	T3I
				C342	T3I
				C350	B1C
				C401	T4F
				C404	T4F
				C410	T4E
				C417	T4D
				C430	B4C
				C432	B4D

				C435	B5D
				C436	B4D
				C437	B4C
				C442	B5C
				C512	T3F
				C530	T2G
				C536	T3F
				C538	T2G
				C539	T1G
				C648	B3A
				C649	B3B
				C654	T5G
				C659	B3A
				C660	B3B
				C671	B5F
				C675	B5F
				C676	B5F
				C688	T2B
72	3101054730000	Chip capacitor 0402 0.047UF K 10V(RoHS)	4	C223	T2K
				C225	T2K
				C232	T3K
				R220	T2K
73	3101054740020	Chip capacitor 0.47uF K 10V X5R 0402 (RoHS)	1	C692	B1E
74	3101055600000	Chip capacitor 0402 56PF J 50V(RoHS)	2	C339	T3I
				C343	T3I
75	3101055620010	Chip capacitor 5600PF K 25V X7R 0402 (RoHS)	2	C244	T4K
				C261	B4H
76	3101055630000	Chip capacitor 0402 0.056UF K 10V(RoHS)	1	C236	T3K
77	3101056800000	Chip capacitor 0402 68PF J 50V(RoHS)	4	C219	T2K
				C220	T2K
				C221	T2J
				C340	T3I
78	3101056820000	Chip capacitor 0402 6800PF K 25V(RoHS)	1	C239	T3K
79	3101056830000	Chip capacitor 0402 0.068UF K 6.3V(RoHS)	2	C203	T3K
				C227	T3K
80	3101060500010	Chip capacitor 0603 5PF B 50V (RoHS)	1	C123	T4G
81	3101060590010	Chip capacitor 0603 0.5PF B 50V (RoHS)	3	C112	T5H
				C116	T4G
				C125	T4G
82	3101060600010	Chip capacitor 6PF B 50V C0G 0603 (RoHS)	1	C113	T4H
83	3101060700020	Chip capacitor 0603 7PF B 50V (RoHS)	3	C452	T4C
				C454	T4C
				C456	T4C
84	3101060900010	Chip capacitor 9PF B 50V C0G 0603 (RoHS)	1	C114	T4G
85	3101061000000	Chip capacitor 0603 10PF J 50V (RoHS)	2	C444	T5D

				C457	T4B
86	3101061010010	Chip capacitor 100PF J 50V C0G 0603 (RoHS)	1	C429	T4C
87	3101061020000	Chip capacitor 1000PF K 50V X7R 0603 (RoHS)	2	C450	T4C
				C458	T5C
88	3101061050020	Chip capacitor 0603 1UF K 25V (RoHS)	2	C246	B3J
				C308	B3I
89	3101062000000	Chip capacitor 20PF J 50V C0G 0603 (RoHS)	1	C455	T4B
90	3101062200010	Chip capacitor 0603 22PF J 50V (RoHS)	1	C453	T4B
91	3101063590000	Chip capacitor 0603 3.5PF C 50V(RoHS)	1	C122	T3G
92	3102992000040	Trimmer capacitor 10pF $\pm 2.5$ pF 55V (RoHS)	2	TC100	T5G
				TC101	T4H
93	3104072250060	Tantalum capacitor 2.2UF M 10V -55~+125°C P (RoHS)	4	C302	T3I
				C643	T2E
				C664	T2D
				C665	T2E
94	3104074750070	Tantalum capacitor 4.7UF M 10V -55~+125°C P (RoHS)	5	C262	B4H
				C264	B4H
				C434	B5D
				C695	T3K
				C696	T3K
95	3104081060120	Tantalum capacitor 10UF M 16V -55~+125°C S(RoHS)	2	C229	B2J
				C431	B4C
96	3210107220000	Chip inductor 22nH J 720mA 0.09ohm (RoHS)	4	L513	T2F
				L514	T2E
				L515	T3E
				L516	T3D
97	3210108330000	Chip inductor 33nH J 530mA 0.057ohm (RoHS)	1	L107	T3H
98	3210108390000	Chip inductor 39nH J 490mA 0.067ohm (RoHS)	1	L104	T5H
99	3210305150010	Chip inductor 15nH J 300mA 0.32ohm (RoHS)	1	L505	T3F
100	3210305180000	Chip inductor 18nH J 300mA 0.36ohm (RoHS)	1	L116	T4F
101	3210305220000	Chip inductor 22nH J 300mA 0.42ohm (RoHS)	1	L530	T2F
102	3210305390000	Chip inductor 39nH J 200mA 0.65ohm (RoHS)	1	L531	T2F
103	3210306561010	Chip inductor 560nH K 35mA 1.55ohm (RoHS)	1	L304	T3I
104	3210406331000	Chip inductor 330nH K 35mA 0.85ohm (RoHS)	2	L303	T3I
				L306	T3I
105	3212105101000	Chip inductor 100nH J 150mA 1.6ohm(RoHS)	3	L111	T4G
				L115	T3G
				L400	T4F
106	3212105470000	Chip inductor 47nH J 200mA 0.58ohm (RoHS)	1	L112	T3G
107	3213212102000	Chip inductor 1uH J 245mA 1.1 $\Omega$ (RoHS)	3	L403	T4E
				L454	B4B
				L510	T1G
108	3213212331000	Chip inductor 330nH J 400mA 0.6 $\Omega$ (RoHS)	1	L509	T2G
109	3213212561000	Chip inductor 0.56uH J 325mA 0.75 $\Omega$ (RoHS)	1	L408	T4C
110	3213306102000	Chip inductor 1uH K 25mA 0.6 $\Omega$ (RoHS)	5	L200	T3K

				L300	T4J
				L301	T5I
				L307	T3I
				L308	T4I
111	3213306221010	Chip inductor 0.22uH K 50mA 0.8Ω(RoHS)	1	L607	B3I
112	3213306332000	Chip inductor 3.3uH K 15mA 1.55Ω(RoHS)	3	L109	T4G
				L110	T3G
				L305	T3I
113	3215006100010	Chip inductor 10nH J 600mA 0.12Ω(RoHS)	1	L512	T3E
114	3221506601000	Bead 600Ω 100MHz ±25% 500mA(RoHS)	3	L100	T5I
				L402	T4F
				L650	T4G
115	3221507221000	Bead 220Ω 100MHz ±25% 2000mA(RoHS)	1	L404	T4E
116	3221507600000	Bead 60Ω 100MHz ±25% 3000mA(RoHS)	2	L407	T4D
				L604	T2B
117	3231351630000	Air-core inductor E2-0.35*1.6*3TR (RoHS)	1	L411	T5C
118	3231351640000	Air-core inductor E2-0.35*1.6*4TL (RoHS)	4	L501	T3D
				L502	T3E
				L506	T3F
				L507	T2F
119	3231351680000	Air-core inductor E2-0.35*1.6*8TR (RoHS)	2	L406	T4D
				L500	T4D
120	3303020100020	Switching diode 80V 100mA 0.95V/100mA UHF (RoHS)	2	D607	B5J
				D650	T5G
121	3303030800040	Switching diode 35V 100mA 0.8V/10mA(RoHS)	1	D401	T4C
122	3303020100080	Switching diode 35V 100mA 0.92V/100mA(RoHS)	4	D400	T3F
				D500	T3F
				D501	T4D
				D502	T4D
123	3304040200000	Varactor VR:30V 19.7pF/1VR 2.1pF/28VR(RoHS)	1	D108	T5H
124	3304060300040	Varactor VR:15V 45pF/1VR 12.5pF/4VR(RoHS)	4	D503	T3D
				D504	T3E
				D506	T3E
				D507	T2F
125	3307110100070	LED red 30mA 1.85V(RoHS)	1	D602	B4A
126	3307110100080	LED green 25mA 2.2V (RoHS)	1	D601	B4A
127	3401001000080	PNP transistor 15V 800mA(RoHS)	1	Q654	T1E
128	3401002000990	PNP transistor 10V 30mA(RoHS)	6	Q102	T4G
				Q103	T3H
				Q104	T3G
				Q105	T3I
				Q400	T4F
				Q502	T2I
129	3403007000000	Bias Resistor Transistor Vce:50V Vloff:0.5V Vlon:3V 70mA (RoHS)	1	Q300	T2I

130	3403007000020	Bias Resistor Transistor Vce:50V Vloff:0.3V Vlon:1.4V 70mA (RoHS)	1	Q431	B4D
131	3403008000010	Bias Resistor Transistor Vce:50V Vloff:0.5V Vlon:3V 100mA (RoHS)	3	Q430	B5C
				Q614	B4A
				Q615	B4A
132	3403009000010	Transistor NPN*2 50V -100mA (RoHS)	2	Q609	T2D
				Q613	T2E
133	3406001000090	PNP transistor 9V 100mA(RoHS)	1	Q401	T4F
134	3411002000020	PNP transistor 50V 150mA (RoHS)	1	Q650	T4G
135	3418001000010	PNP transistor 10V 50mA (RoHS)	1	Q500	T3E
136	3499000000140	N-JFET VGS:15V VGSoff:-1.4V IDSS:50mA (RoHS)	2	Q100	T4H
				Q101	T3G
137	3499000000150	Transistor PNP+NPN -50V/50V -100mA/100mA (RoHS)	1	Q652	T4G
138	3499000000180	PNP transistor 12V 2.5A (RoHS)	2	Q610	T2E
				Q611	T2D
139	3501020000030	N-MOSFET VDS:6V ID:20mA (RoHS)	1	Q501	T2G
140	3503010000010	P-MOSFET VDS:-30V ID:-100mA (RoHS)	2	Q210	B1E
				Q653	T4G
141	3503020000030	N-MOSFET VDS:30V ID:100mA (RoHS)	1	Q203	T4K
142	3503040000000	N-MOSFET*2 VDS:30V ID:0.2A (RoHS)	1	Q612	T2D
143	3504990000010	RF Power MOSFET VDS:30V ID:600mA (RoHS)	1	Q402	T4E
144	3515990000000	N-MOSFET VDS:16V ID:3.8A VGS(th):0.4V(RoHS)	1	Q403	T5E
145	3604002055090	PLL IC 520MHz-IN-max (RoHS)	1	U202	T4I
146	3605008005070	Operational amplifier 3~32V 300mW 100dB dual (RoHS)	1	U430	B4D
147	3608015000000	Power management IC Regulators 5V(RoHS)	1	U606	B3I
148	3609016000000	RF/IF demodulator (RoHS)	1	U200	T3J
149	3612031004440	EEPROM 64K 2.7~5.5V(RoHS)	1	U609	B3K
150	3619006005220	Reset IC 1.5Vdd 4.5Vdect(RoHS)	1	U610	B5J
151	3701012850010	TCXO 12.8MHz (RoHS)	1	X300	T5J
152	3701737230020	Crystal 7.3728MHz 30~100ppm 8~12pF(RoHS)	1	X601	B4I
153	3801045030130	Ceramic filter 450KHz $\pm 4.5$ KHz 6.0dB(RoHS)	1	CF300	T1J
154	3802388540010	Crystal filter 38.850MHz $\pm 5.0$ KHz 4.0dB(RoHS)	1	XF1	T2H
155	5205000001000	Battery connector black PA9T/brass 00(RoHS)	1	G1	T3C
156	3101051230000	Chip capacitor 0.012UF K 25V X7R 0402 (RoHS)	1	C238	T3K
157	3101051820000	Chip capacitor 0402 1800PF K 50V(RoHS)	2	C233	T3K
				C235	T4K
158	3101051810010	Chip capacitor 180p J 50V COG 0402 (RoHS)	1	C513	T3F
159	3213306682000	Chip inductor 6.8uH K 5mA 1.7 $\Omega$ (RoHS)	6	L101	T4H
				L102	T4H
				L103	T5H
				L105	T5G
				L106	T3H
				L108	T4H
160	3304060300010	Varactor VR:15V 26pF/1VR 5.8pF/4VR(RoHS)	8	D100	T5H



				D101	T5H
				D102	T3H
				D103	T3H
				D104	T5H
				D105	T5H
				D106	T3H
				D107	T4H
161	3610007000020	MCU MB95F108AMWPFV-GE1 8-bit 2.7~5.5V(RoHS)	1	U605	B4J
162	3001051820010	Chip resistor 0402 1.8KΩ F 1/16W(RoHS)	1	R303	T4J
163	3231351670000	Air-core inductor E2-0.35*1.6*7TR (RoHS)	1	L451	T4C
164	3231351660000	Air-core inductor E2-0.35*1.6*6TR (RoHS)	2	L450	T4C
				L452	T4B
165	3210305560000	Chip inductor 56nH J 200mA 0.82ohm(RoHS)	1	L114	T3G
166	3101061200000	Chip capacitor 12PF J 50V C0G 0603 (RoHS)	1	C451	T3B
167	3101051800010	Chip capacitor 18PF J 50V C0G 0402 (RoHS)	1	C421	T4F
168	3210305270000	Chip inductor 27nH J 300mA 0.46ohm (RoHS)	1	L113	T3H
169	3101051510000	Chip capacitor 150PF J 50V COG 0402 (RoHS)	3	C108	T4H
				C110	T5H
				C402	T4F
170	3001053920010	Chip resistor 0402 3.9KΩ J 1/16W(RoHS)	1	R404	T5F
171	3001061020010	Chip resistor 0603 1KΩ J 1/10W(RoHS)	1	C247	B1E
172	3210306820000	Chip inductor 82nH J 300mA 0.85ohm(RoHS)	1	L401	T4F
173	3001051800000	Chip resistor 0402 18Ω J 1/16W(RoHS)	1	R408	T5F
174	3210306270000	Chip inductor 27nH J 300mA 0.55ohm(RoHS)	1	L412	T5F
175	3231301340000	Air-core inductor E2 0.3*1.3*4TR (RoHS)	1	L409	T5D
176	3231351650000	Air-core inductor E2-0.35*1.6*5TL (RoHS)	1	L410	T5D
177	3212106680000	Chip inductor 68nH J 300mA 0.85ohm(RoHS)	1	R413	T4E
178	3104071040010	Tantalum capacitor 0.1UF M 20V (RoHS)	1	C102	T4I
179	3399990000080	Zener diode 6.8V -55~125°C (RoHS)	8	D208	B1C
				D200	B1D
				D206	B1C
				D207	B1C
				D209	B2C
				D210	B2C
				D211	B2F
				D430	B5D
180	3302030500020	Zener diode 18V 150°C SOD-323 (RoHS)	1	D655	T2B
181	3001051010000	Chip resistor 0402 100Ω J 1/16W(RoHS)	1	R106	T4G
182	3001051040010	Chip resistor 0402 100KΩ J 1/16W(RoHS)	1	R669	B3J
183	3001051810010	Chip resistor 0402 180Ω J 1/16W(RoHS)	1	R119	T4I
184	3001052730000	Chip resistor 0402 27KΩ J 1/16W(RoHS)	1	R261	B4I
185	3001053930000	Chip resistor 0402 39KΩ J 1/16W(RoHS)	1	R416	T5E
186	3001062220000	Chip resistor 0603 2.2KΩ J 1/10W(RoHS)	1	R409	T5F
187	3101061500010	Chip capacitor 15PF J 50V C0G 0603 (RoHS)	2	C445	T5D
				C446	T5C

188	3101065600000	Chip capacitor 0603 56PF J 50V(RoHS)	1	C443	T5D
189	3101074750010	Chip capacitor 0805 4.7UF K 10V (RoHS)	1	C318	T5J
190	3210106331000	Chip inductor 330nH J 85mA 5.5ohm(RoHS)	1	L504	T3F
191	3001051510010	Chip resistor 0402 150Ω F 1/16W(RoHS)	1	R105	T5H
192	3399990000260	Rectifier diode 10V 15mA 380mV/1mA(RoHS)	1	D508	T3E
193	3303030300000	Schottky barrier diode 40V 30mA(RoHS)	1	D651	T3K
194	3401001000490	PNP transistor 50V 150mA(RoHS)	1	Q655	T3K
195	3401002000150	PNP transistor 50V 150mA (RoHS)	1	Q656	T3K
196	3403008000050	Bias Resistor Transistor vce:50V Vion:0.3V Vbe:0.4V(RoHS)	1	Q209	B2D
197	3503040000010	N-MOSFET*2 VDS:30V ID:0.2A(RoHS)	1	Q208	B1C
198	3602023005740	Audio amplifier 2x0.7W 5V 20dB(RoHS)	1	U206	B1E
199	5202020100040	Connector 20pin Omron(RoHS)	1	J602	B1C
200	3104082260060	Tantalum capacitor 22UF K 10V (RoHS)	2	C361	B1D
				C673	B3I
201	3104071060070	Tantalum capacitor 10UF M 10V (RoHS)	2	C210	B2E
				C336	B1D
202	3104081560050	Tantalum capacitor 15UF M 10V (RoHS)	1	C652	T5G
203	3104083350050	Tantalum capacitor 3.3UF M 16V (RoHS)	1	C101	T4I
204	3104074740020	Tantalum capacitor 0.47UF M 16V (RoHS)	1	C100	T4I
205	3104071560040	Tantalum capacitor 15UF M 6.3V (RoHS)	1	C312	B3I
206	3001051220000	Chip resistor 0402 1.2KΩ J 1/16W(RoHS)	1	R357	B2F
207	3001057520000	Chip resistor 0402 7.5KΩ J 1/16W(RoHS)	1	R210	T3K
208	3101058210010	Chip capacitor 0402 820PF K 50V(RoHS)	2	C206	T3K
				C243	T4K
209	3001056840000	Chip resistor 0402 680KΩ J 1/16W(RoHS)	1	R217	T2J
210	3001084790000	Chip resistor 1206 4.7Ω J 1/4W(RoHS)	1	R349	B1D
211	41006101008C0	PCB VHF C(RoHS)	1		
212	3002996830060	Trimmer resistor 68K ±25% 0.15W (RoHS)	3	VR200	B4K
				VR260	B5H
				VR300	T4J
213	3104274760000	Tantalum capacitor 47UF M 16V (RoHS)	1	C682	T3B

## TC-610P Parts List 1

Difference between VHF HDC1200 Ver. and 2-Tone Ver.

TC-610P VHF HDC1200 Ver.						TC-610P VHF 2-Tone Ver.				
No.	Material No.	Description	Qty.	Ref No.	Print No.	Material No.	Description	Qty.	Ref No.	Print No.
1	3001051030000	Chip resistor 0402 10KΩ J 1/16W(RoHS)	1	R717	B4K	NC	NC	0		
2	3001051230000	Chip resistor 0402 12KΩ J 1/16W(RoHS)	1	R345	B1D	3001051030000	Chip resistor 0402 10KΩ J 1/16W(RoHS)	1	R345	B1D
3	3001051230001	Chip resistor 0402 12KΩ J 1/17W(RoHS)	1	R353	B1E	3001051030001	Chip resistor 0402 10KΩ J 1/17W(RoHS)	1	R353	B1E
4	3001058240000	Chip resistor 0402 820KΩ F 1/16W(RoHS)	1	R346	B1E	3001051250000	Chip resistor 1.2M J 1/16W (RoHS)	1	R346	B1E
5	3001058240001	Chip resistor 0402 820KΩ F 1/17W(RoHS)	1	R347	B1D	3001051250001	Chip resistor 1.2M J 1/16W (RoHS)	1	R347	B1D
6	3101051030020	Chip capacitor 0.01UF K 25V X7R 0402 (RoHS)	1	C276	B4K	3101056820000	Chip capacitor 0402 6800PF K 25V(RoHS)	1	C276	B4K
7	3101051030021	Chip capacitor 0.01UF K 25V X7R 0403 (RoHS)	1	C277	B4K	3101056820001	Chip capacitor 0402 6800PF K 26V(RoHS)	1	C277	B4K
8	3101052230000	Chip capacitor 0402 0.022UF K 16V(RoHS)	1	C215	T1K	3101052730000	Chip capacitor 0402 0.027UF K 16V(RoHS)	1	C215	T1K
9	3101054730000	Chip capacitor 0402 0.047UF K 10V(RoHS)	1	C232	T3K	3101056830000	Chip capacitor 0402 0.068UF K 6.3V(RoHS)	1	C232	T3K
10	3001057520000	Chip resistor 0402 7.5KΩ J 1/16W(RoHS)	1	R210	T3K	NC	NC	0		
11	3101058210010	Chip capacitor 0402 820PF K 50V(RoHS)	1	C206	T3K	3101055610000	Chip capacitor 0402 560PF K 50V(RoHS)	1	C206	T3K
12	3101058210011	Chip capacitor 0402 820PF K 51V(RoHS)	1	C243	T4K	3101051820000	Chip capacitor 0402 1800PF K 50V(RoHS)	1	C243	T4K
13	3001054720000	Chip resistor 0402 4.7KΩ J 1/16W(RoHS)	1	R273	B4J	3001052230010	Chip resistor 0402 22KΩ J 1/16W(RoHS)	1	R273	B4K

14	NC	NC	0			3001050000000	Chip resistor 0402 0Ω J 1/16W(RoHS)	1	R276	B2K
15	NC	NC	0			3001050000001	Chip resistor 0402 0Ω J 1/17W(RoHS)	1	R720	T2K
16	NC	NC	0			3001051020000	Chip resistor 0402 1KΩ F 1/16W(RoHS)	1	R285	B3K
17	NC	NC	0			3001051030000	Chip resistor 0402 10KΩ J 1/16W(RoHS)	1	R272	B2K
18	NC	NC	0			3001051030001	Chip resistor 0402 10KΩ J 1/17W(RoHS)	1	R278	B2K
19	NC	NC	0			3001051030002	Chip resistor 0402 10KΩ J 1/18W(RoHS)	1	R284	B3K
20	NC	NC	0			3001051030003	Chip resistor 0402 10KΩ J 1/19W(RoHS)	1	R601	B2B
21	NC	NC	0			3001051040000	Chip resistor 0402 100KΩ F 1/16W(RoHS)	1	R269	B2J
22	NC	NC	0			3001051040001	Chip resistor 0402 100KΩ F 1/17W(RoHS)	1	R270	B2J
23	NC	NC	0			3001051540000	Chip resistor 0402 150KΩ F 1/16W(RoHS)	1	R282	B2J
24	NC	NC	0			3001051540001	Chip resistor 0402 150KΩ F 1/17W(RoHS)	1	R283	B3J
25	NC	NC	0			3001052220000	Chip resistor 0402 2.2KΩ J 1/16W(RoHS)	1	R602	B2B
26	NC	NC	0			3001052230010	Chip resistor 0402 22KΩ J 1/16W(RoHS)	1	R271	B2K
27	NC	NC	0			3001052230012	Chip resistor 0402 22KΩ J 1/18W(RoHS)	1	R281	B2K
28	NC	NC	0			3101051020010	Chip capacitor 1000PF K 50V X7R 0402 (RoHS)	1	C283	B2K
29	NC	NC	0			3101051020011	Chip capacitor 1000PF K 50V X7R 0403(RoHS)	1	C604	B2A

30	NC	NC	0			3101051020012	Chip capacitor 1000PF K 50V X7R 0404(RoHS)	1	C605	B2B
31	NC	NC	0			3101051020013	Chip capacitor 1000PF K 50V X7R 0405(RoHS)	1	C606	B2B
32	NC	NC	0			3101051030020	Chip capacitor 0.01UF K 25V X7R 0402(RoHS)	1	C284	B2K
33	NC	NC	0			3101051030021	Chip capacitor 0.01UF K 25V X7R 0403(RoHS)	1	C287	B2J
34	NC	NC	0			3101051030020	Chip capacitor 0.01UF K 25V X7R 0402(RoHS)	1	C698	B3K
35	NC	NC	0			3101051040060	Chip capacitor 0.1UF K 16V X7R 0402(RoHS)	1	C608	B1B
36	NC	NC	0			3101054710010	Chip capacitor 0402 470PF K 50V(RoHS)	1	C293	B3K
37	NC	NC	0			3101055620010	Chip capacitor 5600PF K 25V X7R 0402(RoHS)	1	C282	B2K
38	NC	NC	0			3101061050060	Chip capacitor 0603 1UF K 10V(RoHS)	1	C603	B2A
39	NC	NC	0			3104074750070	Tantalum capacitor 4.7UF M 10V (RoHS)	1	C288	B2K
40	NC	NC	0			3104074750071	Tantalum capacitor 4.7UF M 10V (RoHS)	1	C607	B2B
41	NC	NC	0			3221506601000	Bead 600Ω 100MHz ±25% 500mA(RoHS)	1	L601	B2A
42	NC	NC	0			3221506601001	Bead 600Ω 100MHz ±25% 500mA(RoHS)	1	L605	B2J
43	NC	NC	0			3303020100020	Switching diode 80V 100mA 0.95V/100mA UHF(RoHS)	1	D603	B1B
44	NC	NC	0			3403008000070	Bias Resistor Transistor Vce:50V Vloff:0.5V Vlon:3V 100mA (RoHS)	1	Q602	B1B
45	NC	NC	0			3410001000020	PNP transistor 15V 500mA (RoHS)	1	Q601	B2B

46	NC	NC	0			3605008005070	Operational amplifier 3~32V 300mW 100dB dual (RoHS)	1	U203	B2K
47	NC	NC	0			3608015005590	Power management IC Regulators 3V 500mA (RoHS)	1	U601	B2B
48	NC	NC	0			3001051250000	Chip resistor 1.2M J 1/16W (RoHS)	1	R279	B3K
49	NC	NC	0			3001052230000	Chip resistor 0402 22KΩ F 1/16W(RoHS)	1	R280	B3K
50	NC	NC	0			3101053340000	Chip capacitor 0402 0.33UF K 6.3V(RoHS)	1	C281	B2K
51	NC	NC	0			3101053340001	Chip capacitor 0402 0.33UF K 6.4V(RoHS)	1	C286	B2K

## TC-610P Parts List 1

### TC-610P U(3) (HDC1200) Parts List 1

TC-610P U3 (HDC1200) Parts List 1					
No.	Material No.	Description	Qty.	Ref No.	Print No.
1	3001050000000	Chip resistor 0402 0Ω J 1/16W(RoHS)	16	C222	T2K
				R244	B1E
				R308	T4J
				R317	T3I
				R408	T5F
				R510	T2G
				R521	T3E
				R703	T3K
				R704	T3K
				R709	T3K
				R711	B1C
				R712	B1C
				R713	B2C
				R714	B2C
				R717	B4K
				R721	T2K
2	3001051000020	Chip resistor 0402 10Ω F 1/16W(RoHS)	7	R116	T3G
				R241	B3K
				R243	B2A
				R355	B2D
				R406	T5F
				R653	T4G
				R654	T4G
3	3001051010040	Chip resistor 0402 100Ω F 1/16W(RoHS)	4	R540	T2G
				R660	B5J
				R697	B4J
				R698	B4J
4	3001051020000	Chip resistor 0402 1KΩ F 1/16W(RoHS)	17	R102	T4I
				R108	T4G
				R110	T3G
				R309	T3I
				R310	T4J
				R631	B3B
				R632	B3A
				R633	B3B
				R634	B3A
				R643	T2E
				R644	B3I
				R649	T2D
				R650	T4G

				R657	B3I
				R658	B3J
				R670	B5K
				R694	B3J
5	3001051020010	Chip resistor 0402 1KΩ J 1/16W(RoHS)	2	R350	B1C
				R352	B2C
6	3001051030000	Chip resistor 0402 10KΩ J 1/16W(RoHS)	18	R351	B1D
				R104	T5I
				R112	T3G
				R212	T2J
				R213	T1K
				R261	B4I
				R300	T3J
				R301	T3J
				R302	T3J
				R354	B1E
				R359	B2F
				R360	B1E
				R400	T3F
				R436	B4C
				R530	T3F
				R695	B3J
				R696	B3J
				R715	B4K
7	3001051040000	Chip resistor 0402 100KΩ F 1/16W(RoHS)	18	R260	B4I
				R262	B4H
				R266	T4H
				R311	T2I
				R501	T3D
				R502	T3D
				R508	T2F
				R509	T2F
				R512	T2G
				R514	T2G
				R645	B4I
				R646	B4I
				R647	B3I
				R652	T4G
				R655	B3J
				R669	B3J
				R707	T3K
				R708	T3K
8	3001051050000	Chip resistor 0402 1MΩ F 1/16W(RoHS)	3	R437	B4D
				R500	T2E
				R667	B4I



9	3001051230000	Chip resistor 0402 12K $\Omega$ J 1/16W(RoHS)	5	R222	T2K
				R313	T3I
				R314	T3J
				R315	T3J
				R504	T3F
10	3001051240000	Chip resistor 0402 120K $\Omega$ J 1/16W(RoHS)	2	R109	T3G
				R229	T4K
11	3001051510010	Chip resistor 0402 150 $\Omega$ F 1/16W(RoHS)	1	R105	T5G
12	3001051520010	Chip resistor 0402 1.5K $\Omega$ F 1/16W(RoHS)	2	R404	T5F
				R515	T2G
13	3001051530000	Chip resistor 0402 15K $\Omega$ J 1/16W(RoHS)	1	R416	T5E
14	3001051540000	Chip resistor 0402 150K $\Omega$ F 1/16W(RoHS)	8	R225	T2K
				R306	T5J
				R430	B4C
				R431	B4C
				R432	B4C
				R433	B4C
				R434	B4C
				R435	B4C
15	3001051820000	Chip resistor 0402 1.8K $\Omega$ J 1/16W(RoHS)	1	R303	T4J
16	3001051830000	Chip resistor 0402 18K $\Omega$ J 1/16W(RoHS)	3	R224	T2K
				R233	T4K
				R239	T4K
17	3001051840000	Chip resistor 0402 180K $\Omega$ J 1/16W(RoHS)	4	R107	T4G
				R316	T3I
				R511	T2G
				R513	T2G
18	3001051850000	Chip resistor 0402 1.8M $\Omega$ J 1/16W(RoHS)	2	R228	T4K
				R440	B1D
19	3001052200010	Chip resistor 0402 22 $\Omega$ F 1/16W(RoHS)	1	R401	T4F
20	3001052220000	Chip resistor 0402 2.2K $\Omega$ J 1/16W(RoHS)	3	R101	T4I
				R103	T4I
				R438	B4D
21	3001052230010	Chip resistor 0402 22K $\Omega$ J 1/16W(RoHS)	3	R214	T2K
				R221	T2K
				R356	B2E
22	3001052720000	Chip resistor 0402 2.7K $\Omega$ J 1/16W(RoHS)	3	R520	T2I
				R659	T2E
				R663	T2D
23	3001052730010	Chip resistor 0402 27K $\Omega$ F 1/16W(RoHS)	1	R216	T2K
24	3001053030000	Chip resistor 0402 30K $\Omega$ F 1/16W(RoHS)	1	R218	T2K
25	3001053310010	Chip resistor 0402 330 $\Omega$ J 1/16W(RoHS)	6	R114	T3G
				R403	T4F
				R407	T4F
				R516	T2G

				R656	B4A
				R689	B4A
26	3001053320000	Chip resistor 0402 3.3K $\Omega$ J 1/16W(RoHS)	8	R111	T3G
				R113	T3G
				R115	T3F
				R230	T4K
				R263	B4H
				R312	B1I
				R639	T2D
				R664	T2D
27	3001053330000	Chip resistor 0402 33K $\Omega$ F 1/16W(RoHS)	1	R417	T5E
28	3001053340000	Chip resistor 0402 330K $\Omega$ J 1/16W(RoHS)	3	R264	B4H
				R439	B4D
				R701	B5J
29	3001053630000	Chip resistor 0402 36K $\Omega$ J 1/16W(RoHS)	1	R226	T2K
30	3001053940000	Chip resistor 0402 390K $\Omega$ J 1/16W(RoHS)	2	R223	T2K
				R227	T2K
31	3001054700000	Chip resistor 0402 47 $\Omega$ J 1/16W(RoHS)	2	R410	T5F
				R415	T5E
32	3001054710000	Chip resistor 0402 470 $\Omega$ J 1/16W(RoHS)	1	R358	B2F
33	3001054720000	Chip resistor 0402 4.7K $\Omega$ J 1/16W(RoHS)	10	R231	T3K
				R242	B3K
				R273	B4K
				R274	B4K
				R412	T5F
				R441	B4J
				R442	B4J
				R651	T5G
				R699	B4J
				R700	B4K
34	3001054730000	Chip resistor 0402 47K $\Omega$ J 1/16W(RoHS)	17	R702	T2D
				C317	T5J
				R237	T4K
				R267	T4H
				R304	T4J
				R305	T4J
				R307	T5J
				R402	T4F
				R636	B4I
				R637	B4I
				R638	B4I
				R641	B4I
				R668	B4J
				R690	B5J
				R692	T1E

				R693	B5I
				R710	B4I
35	3001054740000	Chip resistor 0402 470KΩ J 1/16W(RoHS)	4	R211	T3J
				R240	T4K
				R642	B2I
				R648	B3I
36	3001055110000	Chip resistor 0402 510Ω J 1/16W(RoHS)	1	R503	T3F
37	3001055630000	Chip resistor 0402 56KΩ J 1/16W(RoHS)	3	R219	T2K
				R238	T4K
				R411	T5F
38	3001055640000	Chip resistor 0402 560KΩ J 1/16W(RoHS)	1	R519	T2I
39	3001056800000	Chip resistor 0402 68Ω J 1/16W(RoHS)	1	R106	T4H
40	3001056810000	Chip resistor 0402 680Ω J 1/16W(RoHS)	1	R405	T5F
41	3001056820000	Chip resistor 0402 6.8KΩ J 1/16W(RoHS)	3	R345	B1D
				R353	B1E
				R505	T3E
42	3001058210000	Chip resistor 0402 820Ω J 1/16W(RoHS)	1	R661	T2D
43	3001058220010	Chip resistor 0402 8.2KΩ F 1/16W(RoHS)	1	R234	T4K
44	3001058240000	Chip resistor 0402 820KΩ F 1/16W(RoHS)	5	R232	T4K
				R346	B1E
				R347	B1D
				R705	T3K
				R706	T3K
45	3001061510000	Chip resistor 0603 150Ω J 1/10W(RoHS)	1	R419	B5C
46	3001070000000	Chip resistor 0805 0Ω J 1/8W(RoHS)	1	R413	T5E
47	3005051020010	Integrated resistor 1K J 1/16W (RoHS)	1	RN1	T4J
48	3099080398000	Chip resistor 1206 0.39Ω J 1/4W(RoHS)	3	R420	B4C
				R421	B4C
				R422	B4C
49	3101050200010	Chip capacitor 2PF B 50V C0G 0402 (RoHS)	7	C133	T3G
				C501	T3D
				C505	T3D
				C508	T3E
				C524	T2F
				C560	T2H
				C561	T2H
50	3101050300000	Chip capacitor 0402 3PF B 50V (RoHS)	2	C137	T3H
				C500	T4D
51	3101050400010	Chip capacitor 0402 4PF B 50V (RoHS)	2	C521	T2F
				C532	T3F
52	3101050500010	Chip capacitor 0402 5PF B 50V (RoHS)	2	C136	T3H
				C138	T3H
53	3101050590020	Chip capacitor 0.5PF B 50V C0G 0402 (RoHS)	1	C400	T3F
54	3101050600010	Chip capacitor 6PF B 50V COG 0402 (RoHS)	11	C111	T5H
				C130	T3G

				C141	T3G
				C402	T4F
				C405	T5F
				C503	T3D
				C507	T3E
				C523	T2F
				C526	T2F
				C531	T3F
				C535	T2F
55	3101050700010	Chip capacitor 7PF B 50V COG 0402 (RoHS)	5	C502	T3D
				C510	T3E
				C515	T3F
				C518	T2F
				C528	T2F
56	3101050800000	Chip capacitor 0402 8PF B 50V (RoHS)	2	C645	B5I
				C691	B4I
57	3101050900000	Chip capacitor 0402 9PF B 50V (RoHS)	1	C110	T5H
58	3101051000020	Chip capacitor 10PF J 50V COG 0402 (RoHS)	6	C132	T3G
				C135	T3H
				C321	T5I
				C322	T5I
				C435	B5D
				C541	T2G
59	3101051010030	Chip capacitor 100PF J 50V COG 0402 (RoHS)	16	C107	T5I
				C266	B4H
				C303	T3J
				C304	T3J
				C305	T3J
				C334	B1I
				C351	B1C
				C352	B1C
				C353	B1C
				C354	B2D
				C357	B1D
				C358	B2D
				C359	B2C
				C362	B2C
				C514	T3E
				C669	T4J
60	3101051020010	Chip capacitor 1000PF K 50V X7R 0402 (RoHS)	31	C658	T1D
				C684	T2D
				C105	T5H
				C106	T4H
				C204	T3K
				C248	B1E

				C265	T4H
				C320	T5I
				C323	T5I
				C341	T3I
				C348	B1D
				C408	T5F
				C414	T5E
				C439	B4D
				C509	T3E
				C527	T2E
				C609	B3I
				C641	B4A
				C644	B4B
				C646	T2D
				C651	T4G
				C653	T5G
				C657	T2D
				C661	T1D
				C666	B4A
				C667	B3A
				C670	B5I
				C680	B3I
				C685	B5J
				C686	B2I
				C689	B4I
61	3101051030020	Chip capacitor 0.01UF K 25V X7R 0402 (RoHS)	17	C237	T4K
				C276	B4K
				C277	B4K
				C300	T3I
				C311	B3I
				C345	B2D
				C416	T4D
				C419	B4C
				C529	T2G
				C540	T1G
				C542	T2H
				C546	T2I
				C547	T2I
				C656	B4K
				C662	T2D
				C677	T1E
				C681	B3I
62	3101051040060	Chip capacitor 0.1UF K 16V X7R 0402 (RoHS)	31	C1	B5I
				C118	T4G
				C127	T3G

				C143	T3G
				C217	T2K
				C231	B2J
				C240	T4K
				C249	T2B
				C253	T4J
				C315	T4J
				C324	T2I
				C325	T2I
				C326	T2J
				C329	T2J
				C330	T2I
				C331	T2I
				C332	T2I
				C333	B1I
				C346	B1D
				C347	B1D
				C409	T4E
				C415	T4D
				C418	B4C
				C433	B4D
				C511	T3F
				C537	T2G
				C642	B3J
				C650	T4G
				C655	T5G
				C683	B2I
				C687	B5I
63	3101051050000	Chip capacitor 1UF K 6.3V X5R 0402 (RoHS)	18	C216	T1K
				C218	T2J
				C226	T2K
				C230	B2J
				C241	T4K
				C242	T4K
				C301	T3I
				C306	T3I
				C307	T3I
				C309	T3I
				C310	B3I
				C440	B4J
				C441	B4K
				C446	B5E
				C678	B4K
				C690	B3I
				C692	T3K

				R275	B4H
64	3101051200020	Chip capacitor 0402 12PF J 50V (RoHS)	1	C544	T2H
65	3101051230000	Chip capacitor 0.012UF K 25V X7R 0402 (RoHS)	1	C238	T4K
66	3101051500020	Chip capacitor 15PF J 50V COG 0402 (RoHS)	1	C121	T3H
67	3101051520000	Chip capacitor 1500PF K 50V X7R 0402 (RoHS)	1	C224	T2J
68	3101051590000	Chip capacitor 0402 1.5PF B 50V (RoHS)	1	C533	T2F
69	3101051800010	Chip capacitor 18PF J 50V C0G 0402 (RoHS)	1	C120	T3H
70	3101051810010	Chip capacitor 180p J 50V COG 0402 (RoHS)	1	C513	T3F
71	3101051820000	Chip capacitor 0402 1800PF K 50V(RoHS)	2	C233	T4K
				C235	T4K
72	3101051830000	Chip capacitor 0402 0.018UF K 16V(RoHS)	1	C207	T3K
73	3101052200010	Chip capacitor 22PF J 50V C0G 0402 (RoHS)	1	C245	T4K
74	3101052220010	Chip capacitor 2200pF K 50V X7R 0402 (RoHS)	1	C258	T4K
75	3101052230000	Chip capacitor 0402 0.022UF K 16V(RoHS)	2	C215	T1K
				C663	B4K
76	3101052710000	Chip capacitor 0402 270PF J 50V(RoHS)	1	C412	T5E
77	3101053300000	Chip capacitor 33PF J 50V C0G 0402 (RoHS)	1	C411	T4E
78	3101053340010	Chip capacitor 0.33UF K 6.3V X5R 0402 (RoHS)	2	C102	T4I
				C104	T5I
79	3101053910000	Chip capacitor 0402 390PF J 50V(RoHS)	3	C206	T3K
				C228	T2J
				C234	T4K
80	3101053920000	Chip capacitor 0402 3900PF K 25V(RoHS)	1	C679	B4K
81	3101054710010	Chip capacitor 0402 470PF K 50V (RoHS)	39	C117	T4G
				C126	T3G
				C131	T4G
				C134	T3G
				C139	T3H
				C140	T3G
				C142	T3G
				C316	T4J
				C335	T4I
				C337	T3I
				C342	T3I
				C350	B1C
				C401	T4F
				C403	T5F
				C404	T4F
				C406	T5F
				C410	T4E
				C417	T4D
				C430	B5C
				C432	B4D
				C436	B4D
				C437	B4C

				C442	B5C
				C445	B5E
				C512	T3F
				C530	T2G
				C536	T3F
				C538	T2G
				C539	T1G
				C601	T2B
				C602	T2B
				C648	B3A
				C649	B2A
				C654	T5G
				C659	B3A
				C660	B3B
				C671	B5F
				C675	B5F
				C676	B5F
82	3101054730000	Chip capacitor 0402 0.047UF K 10V(RoHS)	5	C205	T3K
				C223	T2K
				C225	T2K
				C232	T3K
				R220	T2K
83	3101054740020	Chip capacitor 0.47uF K 10V X5R 0402 (RoHS)	1	C208	B1E
84	3101055600000	Chip capacitor 0402 56PF J 50V(RoHS)	2	C339	T3I
				C343	T3I
85	3101055620010	Chip capacitor 5600PF K 25V X7R 0402 (RoHS)	1	C261	B4H
86	3101055630000	Chip capacitor 0402 0.056UF K 10V(RoHS)	1	C236	T4K
87	3101056800000	Chip capacitor 0402 68PF J 50V(RoHS)	4	C219	T2K
				C220	T2K
				C221	T2J
				C340	T3I
88	3101056820000	Chip capacitor 0402 6800PF K 25V(RoHS)	1	C239	T4K
89	3101056830000	Chip capacitor 0402 0.068UF K 6.3V(RoHS)	1	C227	T3K
90	3101060100010	Chip capacitor 1PF B 50V C0G 0603 (RoHS)	5	C125	T4G
				C451	T3B
				C452	T4C
				C456	T4C
				C459	T5C
91	3101060300010	Chip capacitor 3PF B 50V C0G 0603 (RoHS)	3	C115	T4G
				C425	T5D
				C455	T4B
92	3101060390000	Chip capacitor 0603 0.3PF B 50V (RoHS)	1	C116	T4G
93	3101060400010	Chip capacitor 4PF B 50V C0G 0603 (RoHS)	4	C114	T4H
				C123	T3G
				C427	T5C



				C428	T5C
94	3101060500010	Chip capacitor 0603 5PF B 50V (RoHS)	2	C113	T4H
				C122	T3G
95	3101060590010	Chip capacitor 0603 0.5PF B 50V (RoHS)	2	C112	T4H
				C424	T4D
96	3101061000000	Chip capacitor 0603 10PF J 50V (RoHS)	2	C124	T4G
				C423	T4D
97	3101061010010	Chip capacitor 100PF J 50V C0G 0603 (RoHS)	1	C450	T4C
98	3101061020000	Chip capacitor 1000PF K 50V X7R 0603 (RoHS)	1	C458	T5C
99	3101061050020	Chip capacitor 0603 1UF K 25V (RoHS)	2	C246	B3J
				C308	B3I
100	3101061590010	Chip capacitor 0603 1.5PF B 50V (RoHS)	2	C454	T4C
				C457	T4B
101	3101062240000	Chip capacitor 0603 0.22UF K 10V(RoHS)	1	C100	T4I
102	3101062700010	Chip capacitor 0603 27PF J 50V (RoHS)	1	C429	T4C
103	3101064790010	Chip capacitor 0603 4.7PF B 50V(RoHS)	1	C453	T4B
104	3101071050010	Chip capacitor 0805 1UF K 10V (RoHS)	1	C318	T5J
105	3102992000040	Trimmer capacitor 10pF $\pm$ 2.5pF 55V (RoHS)	2	TC100	T5G
				TC101	T4H
106	3210108230010	Chip inductor 23nH J 590mA 0.046ohm (RoHS)	2	L104	T5H
				L107	T3H
107	3210305180000	Chip inductor 18nH J 300mA 0.36ohm (RoHS)	1	L113	T3H
108	3210305220000	Chip inductor 22nH J 300mA 0.42ohm (RoHS)	3	L114	T3G
				L400	T4F
				L530	T2F
109	3210305330000	Chip inductor 33nH J 200mA 0.58ohm (RoHS)	1	L115	T3G
110	3210305390000	Chip inductor 39nH J 200mA 0.65ohm (RoHS)	1	L111	T4G
111	3210306101000	Chip inductor 100nH J 300mA 0.90ohm (RoHS)	1	L504	T3F
112	3210306220000	Chip inductor 22nH J 300mA 0.50ohm (RoHS)	3	L401	T4F
				L503	T3E
				L505	T2F
113	3210306561010	Chip inductor 560nH K 35mA 1.55ohm (RoHS)	1	L304	T3I
114	3210406331000	Chip inductor 330nH K 35mA 0.85ohm (RoHS)	2	L303	T3I
				L306	T3I
115	3212105470000	Chip inductor 47nH J 200mA 0.58ohm (RoHS)	1	L112	T3G
116	3213212102000	Chip inductor 1uH J 245mA 1.1 $\Omega$ (RoHS)	3	L403	T4E
				L453	B4B
				L510	T1G
117	3213212331000	Chip inductor 330nH J 400mA 0.6 $\Omega$ (RoHS)	1	L509	T2G
118	3213212820010	Chip inductor 82nH J 300mA 0.75 $\Omega$ (RoHS)	1	L408	B5C
119	3213306102000	Chip inductor 1uH K 25mA 0.6 $\Omega$ (RoHS)	5	L200	T2K
				L300	T4J
				L301	T5I
				L307	T3I
				L308	T4I

120	3213306221010	Chip inductor 0.22uH K 50mA 0.8Ω (RoHS)	1	L607	B3I
121	3213306332000	Chip inductor 3.3uH K 15mA 1.55Ω (RoHS)	9	L101	T5H
				L102	T3H
				L103	T5H
				L105	T4G
				L106	T3H
				L108	T4G
				L109	T4H
				L110	T3G
				L305	T3I
122	3217106829000	Chip inductor 8.2nH J 700mA 0.115Ω (RoHS)	1	L405	T4E
123	3221506601000	Bead 600Ω 100MHz ±25% 500mA (RoHS)	3	L100	T5I
				L402	T4F
				L650	T4G
124	3221507221000	Bead 220Ω 100MHz ±25% 2000mA (RoHS)	1	L404	T4E
125	3221507600000	Bead 60Ω 100MHz ±25% 3000mA (RoHS)	2	L407	T4D
				L604	T2B
126	3231351440000	Air-core inductor E2-0.35*1.4*4TR (RoHS)	1	L507	T2F
127	3231351640000	Air-core inductor E2-0.35*1.6*4TL (RoHS)	8	L450	T4C
				L451	T4C
				L452	T4B
				L454	T5B
				L500	T4D
				L501	T3D
				L502	T3E
				L508	T2F
128	3231351680000	Air-core inductor E2-0.35*1.6*8TR (RoHS)	1	L406	T4D
129	3303020100020	Switching diode 80V 100mA 0.95V/100mA UHF (RoHS)	2	D607	B5J
				D650	T5G
130	3303020100070	Switching diode 35V 100mA (RoHS)	1	D401	T4C
131	3303020100080	Switching diode 35V 100mA 0.92V/100mA (RoHS)	4	D400	T3F
				D500	T3F
				D501	T3D
				D502	T3D
132	3303030300000	Schottky barrier diode 40V 30mA 0.26V/1mA (RoHS)	1	D651	T3K
133	3303210200000	Varactor SS-Mini 7 3.6P 0.3Ω 6V (RoHS)	2	D100	T5H
				D101	T5H
134	3304040200000	Varactor VR:30V 19.7pF/1VR 2.1pF/28VR (RoHS)	1	D104	T4H
135	3304060300050	Varactor VR:15V 16.4pF/1VR 5.5pF/4VR (RoHS)	6	D102	T3H
				D103	T3H
				D503	T3D
				D504	T3E
				D506	T2F
				D507	T2F
136	3307110100070	LED red 30mA 1.85V (RoHS)	1	D602	B4A

137	3307110100080	LED green 25mA 2.2V (RoHS)	1	D601	B4A
138	3399990000260	Rectifier diode 10V 15mA 380mV/1mA (RoHS)	1	D508	T3E
139	3401001000080	PNP transistor 15V 800mA (RoHS)	1	Q654	T1E
140	3401001000490	PNP transistor 50V 150mA (RoHS)	1	Q655	T3K
141	3401002000150	PNP transistor 50V 150mA (RoHS)	1	Q656	T3K
142	3401002000990	PNP transistor 10V 30mA (RoHS)	6	Q102	T4G
				Q103	T3H
				Q104	T3G
				Q105	T3I
				Q400	T4F
				Q502	T2I
143	3403007000000	Bias Resistor Transistor Vce:50V Vloff:0.5V Vlon:3V 70mA	1	Q300	T2I
144	3403007000020	Bias Resistor Transistor Vce:50V Vloff:0.3V Vlon:1.4V 70mA	1	Q431	B4D
145	3403008000010	Bias Resistor Transistor Vce:50V Vloff:0.5V Vlon:3V 100mA	3	Q430	B5C
				Q614	B4A
				Q615	B4A
146	3403008000050	Bias Resistor Transistor Vce:50V Vloff:0.3V Vlon:1.4V	1	Q209	B2D
147	3403009000010	Transistor NPN*2 50V -100mA (RoHS)	2	Q609	T2D
				Q613	T2E
148	3406001000090	PNP transistor 9V 100mA (RoHS)	1	Q401	T4F
149	3411002000020	PNP transistor 50V 150mA (RoHS)	1	Q650	T4G
150	3418001000010	PNP transistor 10V 50mA (RoHS)	1	Q500	T3E
151	3499000000140	N-JFET VGS:15V VGSoff:-1.4V IDSS:50mA (RoHS)	2	Q100	T4H
				Q101	T3G
152	3499000000150	Transistor PNP+NPN -50V/50V -100mA/100mA (RoHS)	1	Q652	T4G
153	3499000000180	PNP transistor 12V 2.5A (RoHS)	2	Q610	T2E
				Q611	T2D
154	3501020000030	N-MOSFET VDS:6V ID:20mA VGS(th):0.7V (RoHS)	1	Q501	T2G
155	3503010000010	P-MOSFET VDS:-30V ID:-100mA VGS(th):-1.9V (RoHS)	2	Q210	B1E
				Q653	T4G
156	3503020000030	N-MOSFET VDS:30V ID:100mA VGS(th):3.0V (RoHS)	1	Q203	T4K
157	3503040000000	N-MOSFET*2 VDS:30V ID:0.2A (RoHS)	1	Q612	T2D
158	3503040000010	N-MOSFET*2 VDS:30V ID:0.2A (RoHS)	1	Q208	B1C
159	3504990000010	RF Power MOSFET VDS:30V ID:600mA (RoHS)	1	Q402	T5E
160	3515990000000	N-MOSFET VDS:16V ID:3.8A VGS(th):0.4V (RoHS)	1	Q403	T5E
161	3602023005740	Audio amplifier 2x0.7W 5V 20dB (RoHS)	1	U206	B1E
162	3604002055090	PLL IC 520MHz-IN-max -30~+85°C (RoHS)	1	U202	T4I
163	3605008005070	Operational amplifier 3~32V 300mW 100dB dual (RoHS)	1	U430	B4D
164	3608015000000	Power management IC 5V -40~+85°C (RoHS)	1	U606	B3I
165	3609016000000	RF/IF demodulator (RoHS)	1	U200	T3J
166	3610007000020	MCU MB95F108AMWPFV-GE1 8-bit 2.7~5.5V 10MHz	1	U605	B4J
167	3612031004440	EEPROM 64K 2.7~5.5V (RoHS)	1	U609	B3K
168	3619006005220	Reset IC 1.5Vdd 4.5Vdect -40~+85°C (RoHS)	1	U610	B5J
169	3701012850010	TCXO 12.8MHz NSA0298A (RoHS)	1	X300	T5J
170	3701737230020	Crystal 7.3728MHz 30~100ppm 8~12pF (RoHS)	1	X601	B4I
171	3801045030130	Ceramic filter 450KHz ±4.5KHz 6.0dB (RoHS)	1	CF300	T1J

172	3802388540010	Crystal filter 38.850MHz $\pm$ 5.0KHz 4.0dB (RoHS)	1	XF1	T2H
173	5202020100040	Connector XF2M-2015-1A 20pin Omron(RoHS)	1	J602	B1C
174	5205000001000	Battery connector black PA9T/brass 00 (RoHS)	1	G1	T3C
175	3101054700010	Chip capacitor 47PF J 50V COG 0402 (RoHS)	1	C280	B1A
176	3001061020010	Chip resistor 0603 1K $\Omega$ J 1/10W(RoHS)	1	C247	B1E
177	3302030500020	Zener diode 18V 150 $^{\circ}$ C (RoHS)	1	D610	T2B
178	3399990000080	Zener diode 6.8V -55~125 $^{\circ}$ C(RoHS)	8	D208	B1C
				D201	B1C
				D202	B1C
				D203	B2C
				D206	B2C
				D207	B2C
				D250	B1D
				D430	B5D
179	3001055610000	Chip resistor 0402 560 $\Omega$ J 1/16W(RoHS)	3	R100	T4I
				R517	T2H
				R518	T2I
180	3104082260060	Tantalum capacitor 22UF K 10V (RoHS)	2	C361	B1D
				C673	B3I
181	3104081060120	Tantalum capacitor 10UF M 16V (RoHS)	2	C229	B2J
				C431	B4C
182	3104074750070	Tantalum capacitor 4.7UF M 10V (RoHS)	4	C262	B4H
				C434	B5D
				C695	T3K
				C696	T3K
183	3104072250060	Tantalum capacitor 2.2UF M 10V (RoHS)	4	C302	T3I
				C643	T2E
				C664	T2D
				C665	T2E
184	3104071060070	Tantalum capacitor 10UF M 10V (RoHS)	2	C209	B2E
				C336	B1D
185	3104071050070	Tantalum capacitor 1UF M 16V (RoHS)	1	C264	B4H
186	9900000001340	Lead-free solder paste FLY905-T1/ (RoHS)	0		
187	3104081560050	Tantalum capacitor 15UF M 10V (RoHS)	1	C652	T5G
188	3104086850040	Tantalum capacitor 6.8UF M 10V (RoHS)	1	C101	T4I
189	3104071560040	Tantalum capacitor 15UF M 6.3V (RoHS)	1	C312	B2I
190	3001051220000	Chip resistor 0402 1.2K $\Omega$ J 1/16W(RoHS)	2	R357	B2F
				R506	T3E
191	3001053930000	Chip resistor 0402 39K $\Omega$ J 1/16W(RoHS)	1	R235	T4K
192	3101052720000	Chip capacitor 0402 2700PF K 50V(RoHS)	1	C243	T4K
193	3101053930000	Chip capacitor 0402 0.039UF K 10V(RoHS)	1	C203	T3K
194	3101058220000	Chip capacitor 0402 8200PF K 50V(RoHS)	1	C244	T4K
195	3101060700020	Chip capacitor 0603 7PF B 50V (RoHS)	1	C422	T4D
196	3101061200000	Chip capacitor 12PF J 50V C0G 0603 (RoHS)	1	C421	T5D
197	3001056840000	Chip resistor 0402 680K $\Omega$ J 1/16W(RoHS)	1	R217	T2J

198	3001084790000	Chip resistor 1206 4.7 $\Omega$ J 1/4W (RoHS)	1	R349	B1D
199	41006101005C0	PCB C (RoHS)	1		
200	3002992240020	Trimmer resistor 220K $\Omega$ $\pm$ 25% (RoHS)	1	VR200	B4K
201	3002996830060	Trimmer resistor 68K $\pm$ 25% 0.15W (RoHS)	2	VR260	B5H
				VR300	T4J
202	3104274760000	Tantalum capacitor 47UF M 16V (RoHS)	1	C682	T3B

## TC-610P Parts List 1

Difference between U(3) HDC1200 Ver. and 2-Tone Ver.

TC-610P U(3) HDC1200 Ver.						TC-610P U(3) 2-Tone Ver.				
No.	Material No.	Description	Qty.	Ref No.	Print No.	Material No.	Description	Qty.	Ref No.	Print No.
1	3001051030000	Chip resistor 0402 10K $\Omega$ J 1/16W(RoHS)	1	R213	T1K	3001052730000	Chip resistor 0402 27K $\Omega$ J 1/16W(RoHS)	1	R213	T1K
2	3001051030001	Chip resistor 0402 10K $\Omega$ J 1/17W(RoHS)	1	R715	B4K	NC	NC	0		
3	3001056820000	Chip resistor 0402 6.8K $\Omega$ J 1/16W(RoHS)	1	R345	B1D	3001055620000	Chip resistor 0402 5.6K $\Omega$ J 1/16W(RoHS)	1	R345	B1D
4	3001056820001	Chip resistor 0402 6.8K $\Omega$ J 1/17W(RoHS)	1	R353	B1E	3001055620001	Chip resistor 0402 5.6K $\Omega$ J 1/17W(RoHS)	1	R353	B1E
5	3001058240000	Chip resistor 0402 820K $\Omega$ F 1/16W(RoHS)	1	R346	B1E	3001051250000	Chip resistor 1.2M J 1/16W (RoHS)	1	R346	B1E
6	3001058240000	Chip resistor 0402 820K $\Omega$ F 1/16W(RoHS)	1	R347	B1D	3001051250000	Chip resistor 1.2M J 1/16W (RoHS)	1	R347	B1D
7	3101053910000	Chip capacitor 0402 390PF J 50V(RoHS)	1	C206	T3K	3101053310020	Chip capacitor 0402 330PF K 50V(RoHS)	1	C206	T3K
8	3101054730000	Chip capacitor 0402 0.047UF K 10V(RoHS)	1	C205	T3K	3101056830000	Chip capacitor 0402 0.068UF K 6.3V(RoHS)	1	C205	T3K
9	3303020100070	Switching diode 35V 100mA (RoHS)	1	D401	T4C	3303030800040	Switching diode 35V 100mA 0.8V/10mA (RoHS)	1	D401	T4C
10	3303210200000	Varactor 3.6P 0.3 $\Omega$ 6V (RoHS)	1	D100	T5H	3304060300050	Varactor VR:15V 16.4pF/1VR 5.5pF/4VR (RoHS)	1	D100	T5H
11	3303210200001	Varactor 3.6P 0.3 $\Omega$ 7V (RoHS)	1	D101	T5H	3304060300051	Varactor VR:15V 16.4pF/1VR 5.5pF/4VR(RoHS)	1	D101	T5H
12	3001053930000	Chip resistor 0402 39K $\Omega$ J 1/16W(RoHS)	1	R235	T4K	3001054730000	Chip resistor 0402 47K $\Omega$ J 1/16W(RoHS)	1	R235	T4K
13	3101052720000	Chip capacitor 0402 2700PF K 50V(RoHS)	1	C243	T4K	3101052220010	Chip capacitor 2200pF K 50V X7R 0402 (RoHS)	1	C243	T4K

14	3001054720000	Chip resistor 0402 4.7KΩ J 1/16W(RoHS)	1	R273	B4K	3001052230000	Chip resistor 0402 22KΩ F 1/16W(RoHS)	1	R273	B4K
15	NC	NC	0			3001050000000	Chip resistor 0402 0Ω J 1/16W(RoHS)	1	R276	B2K
16	NC	NC	0			3001050000001	Chip resistor 0402 0Ω J 1/17W(RoHS)	1	R720	T2K
17	NC	NC	0			3001051020000	Chip resistor 0402 1KΩ F 1/16W(RoHS)	1	R285	B3K
18	NC	NC	0			3001051030000	Chip resistor 0402 10KΩ J 1/16W(RoHS)	1	R272	B2K
19	NC	NC	0			3001051030001	Chip resistor 0402 10KΩ J 1/17W(RoHS)	1	R278	B2K
20	NC	NC	0			3001051030002	Chip resistor 0402 10KΩ J 1/18W(RoHS)	1	R284	B3K
21	NC	NC	0			3001051030003	Chip resistor 0402 10KΩ J 1/19W(RoHS)	1	R601	B2B
22	NC	NC	0			3001051040000	Chip resistor 0402 100KΩ F 1/16W(RoHS)	1	R269	B2J
23	NC	NC	0			3001051040001	Chip resistor 0402 100KΩ F 1/17W(RoHS)	1	R270	B2J
24	NC	NC	0			3001051540000	Chip resistor 0402 150KΩ F 1/16W(RoHS)	1	R282	B2J
25	NC	NC	0			3001051540001	Chip resistor 0402 150KΩ F 1/17W(RoHS)	1	R283	B3J
26	NC	NC	0			3001052220000	Chip resistor 0402 2.2KΩ J 1/16W(RoHS)	1	R602	B2B
27	NC	NC	0			3001052230010	Chip resistor 0402 22KΩ J 1/16W(RoHS)	1	R271	B2K
28	NC	NC	0			3001052230011	Chip resistor 0402 22KΩ J 1/17W(RoHS)	1	R281	B2K
29	NC	NC	0			3101051020010	Chip capacitor 1000PF K 50V X7R 0402 (RoHS)	1	C283	B2K
30	NC	NC	0			3101051020010	Chip capacitor 1000PF K 50V X7R 0402 (RoHS)	1	C604	B2A

31	NC	NC	0			3101051020011	Chip capacitor 1000PF K 50V X7R 0403 (RoHS)	1	C605	B2B
32	NC	NC	0			3101051020012	Chip capacitor 1000PF K 50V X7R 0404 (RoHS)	1	C606	B2B
33	NC	NC	0			3101051030020	Chip capacitor 0.01UF K 25V X7R 0402 (RoHS)	1	C284	B2K
34	NC	NC	0			3101051030021	Chip capacitor 0.01UF K 25V X7R 0403 (RoHS)	1	C287	B2J
35	NC	NC	0			3101051030022	Chip capacitor 0.01UF K 25V X7R 0404 (RoHS)	1	C698	B3K
36	NC	NC	0			3101051040060	Chip capacitor 0.1UF K 16V X7R 0402 (RoHS)	1	C608	B1B
37	NC	NC	0			3101054710010	Chip capacitor 0402 470PF K 50V (RoHS)	1	C293	B3K
38	NC	NC	0			3101055620010	Chip capacitor 5600PF K 25V X7R 0402 (RoHS)	1	C282	B2K
39	NC	NC	0			3101061050060	Chip capacitor 0603 1UF K 10V (RoHS)	1	C603	B2A
40	NC	NC	0			3221506601000	Bead 600Ω 100MHz ±25% 500mA (RoHS)	1	L601	B2A
41	NC	NC	0			3221506601001	Bead 600Ω 100MHz ±25% 500mA (RoHS)	1	L605	B2J
42	NC	NC	0			3303020100020	Switching diode 80V 100mA 0.95V/100mA UHF(RoHS)	1	D603	B1B
43	NC	NC	0			3403008000070	Bias Resistor Transistor Vce:50V Vloff:0.5V Vlon:3V 100mA(RoHS)	1	Q602	B1B
44	NC	NC	0			3410001000020	PNP transistor 15V 500mA (RoHS)	1	Q601	B2B
45	NC	NC	0			3605008005070	Operational amplifier 3~32V 300mW 100dB dual (RoHS)	1	U203	B2K
46	NC	NC	0			3608015005590	Power management IC Regulators 3V 500mA (RoHS)	1	U601	B2B
47	NC	NC	0			3104074750070	Tantalum capacitor 4.7UF M 10V (RoHS)	1	C288	B2K



48	NC	NC	0			3104074750071	Tantalum capacitor 4.7UF M 10V (RoHS)	1	C607	B2B
49	NC	NC	0			3001051250000	Chip resistor 1.2M J 1/16W (RoHS)	1	R279	B3K
50	NC	NC	0			3001052230000	Chip resistor 0402 22KΩ F 1/16W(RoHS)	1	R280	B3K
51	NC	NC	0			3101053340000	Chip capacitor 0402 0.33UF K 6.3V(RoHS)	1	C281	B2K
52	NC	NC	0			3101053340001	Chip capacitor 0402 0.33UF K 6.4V(RoHS)	1	C286	B2K

# **TC-610P Parts List 1**

Difference between U(3) HDC1200 Ver. and U(5) HDC1200 Ver.

TC-610P U(3) HDC1200 Ver.						TC-610P U(5) HDC1200 Ver.				
No.	Material No.	Description	Qty.	Ref No.	Print No.	Material No.	Description	Qty.	Ref No.	Print No.
1	3001050000000	Chip resistor 0402 0Ω J 1/16W(RoHS)	1	R408	T5F	3001051000020	Chip resistor 0402 10Ω F 1/16W(RoHS)	1	R408	T5F
2	3001051020000	Chip resistor 0402 1KΩ F 1/16W(RoHS)	1	R108	T4G	3001051010040	Chip resistor 0402 100Ω F 1/16W(RoHS)	1	R108	T4G
3	3001056820000	Chip resistor 0402 6.8KΩ J 1/16W(RoHS)	1	R345	B1D	3001051030000	Chip resistor 0402 10KΩ J 1/16W(RoHS)	1	R345	B1D
4	3001056820000	Chip resistor 0402 6.8KΩ J 1/16W(RoHS)	1	R353	B1E	3001051030000	Chip resistor 0402 10KΩ J 1/16W(RoHS)	1	R353	B1E
5	3001054720000	Chip resistor 0402 4.7KΩ J 1/16W(RoHS)	1	R242	B3K	3001051520010	Chip resistor 0402 1.5KΩ F 1/16W(RoHS)	1	R242	B3K
6	3001051220000	Chip resistor 0402 1.2KΩ J 1/16W(RoHS)	1	R357	B2F	3001051520010	Chip resistor 0402 1.5KΩ F 1/16W(RoHS)	1	R357	B2F
7	3001051830000	Chip resistor 0402 18KΩ J 1/16W(RoHS)	1	R239	T4K	3001051530000	Chip resistor 0402 15KΩ J 1/16W(RoHS)	1	R239	T4K
8	3001050000000	Chip resistor 0402 0Ω J 1/16W(RoHS)	1	R510	T2G	3001052210000	Chip resistor 0402 220Ω J 1/16W(RoHS)	1	R510	T2G
9	3001050000000	Chip resistor 0402 0Ω J 1/16W(RoHS)	1	R709	T3K	3001052210000	Chip resistor 0402 220Ω J 1/16W(RoHS)	1	R709	T3K
10	3001050000000	Chip resistor 0402 0Ω J 1/16W(RoHS)	1	R521	T3E	3001052790000	Chip resistor 0402 2.7Ω J 1/16W(RoHS)	1	R521	T3E
11	3001051220000	Chip resistor 0402 1.2KΩ J 1/16W(RoHS)	1	R506	T3E	3001054720000	Chip resistor 0402 4.7KΩ J 1/16W(RoHS)	1	R506	T3E
12	3001054740000	Chip resistor 0402 470KΩ J 1/16W(RoHS)	1	R211	T3J	3001055640000	Chip resistor 0402 560KΩ J 1/16W(RoHS)	1	R211	T3J
13	3001061510000	Chip resistor 0603 150Ω J 1/10W(RoHS)	1	R419	B5C	3001061010040	Chip resistor 0603 100Ω F 1/10W (RoHS)	1	R419	B5C

14	3101050200010	Chip capacitor 2PF B 50V COG 0402 (RoHS)	1	C505	T3D	3101050400010	Chip capacitor 0402 4PF B 50V (RoHS)	1	C505	T3D
15	3101050200010	Chip capacitor 2PF B 50V COG 0402 (RoHS)	1	C524	T2F	3101050400010	Chip capacitor 0402 4PF B 50V (RoHS)	1	C524	T2F
16	3101051590000	Chip capacitor 0402 1.5PF B 50V (RoHS)	1	C533	T2F	3101050400010	Chip capacitor 0402 4PF B 50V (RoHS)	1	C533	T2F
17	3101050200010	Chip capacitor 2PF B 50V COG 0402 (RoHS)	1	C508	T3E	3101050800000	Chip capacitor 0402 8PF B 50V (RoHS)	1	C508	T3E
18	3101050590020	Chip capacitor 0.5PF B 50V COG 0402(RoHS)	1	C400	T3F	3101051030020	Chip capacitor 0.01UF K 25V X7R 0402 (RoHS)	1	C400	T3F
19	3101050700010	Chip capacitor 7PF B 50V COG 0402 (RoHS)	1	C510	T3E	3101051040060	Chip capacitor 0.1UF K 16V X7R 0402 (RoHS)	1	C510	T3E
20	3101050700010	Chip capacitor 7PF B 50V COG 0402 (RoHS)	1	C515	T3F	3101051040060	Chip capacitor 0.1UF K 16V X7R 0402 (RoHS)	1	C515	T3F
21	3101050600010	Chip capacitor 6PF B 50V COG 0402 (RoHS)	1	C526	T2F	3101051100010	Chip capacitor 0402 11PF J 50V (RoHS)	1	C526	T2F
22	3101050600010	Chip capacitor 6PF B 50V COG 0402 (RoHS)	1	C111	T5H	3101051200020	Chip capacitor 0402 12PF J 50V (RoHS)	1	C111	T5H
23	3101050700010	Chip capacitor 7PF B 50V COG 0402 (RoHS)	1	C502	T3D	3101051200020	Chip capacitor 0402 12PF J 50V (RoHS)	1	C502	T3D
24	3101050600010	Chip capacitor 6PF B 50V COG 0402 (RoHS)	1	C503	T3D	3101051500020	Chip capacitor 15PF J 50V COG 0402 (RoHS)	1	C503	T3D
25	3101050900000	Chip capacitor 0402 9PF B 50V (RoHS)	1	C110	T5H	3101052700000	Chip capacitor 27PF J 50V COG 0402 (RoHS)	1	C110	T5H
26	3101051800010	Chip capacitor 18PF J 50V COG 0402 (RoHS)	1	C120	T3H	3101052700000	Chip capacitor 27PF J 50V COG 0402 (RoHS)	1	C120	T3H
27	3101051500020	Chip capacitor 15PF J 50V COG 0402 (RoHS)	1	C121	T3H	3101054700010	Chip capacitor 47PF J 50V COG 0402 (RoHS)	1	C121	T3H
28	3101050700010	Chip capacitor 7PF B 50V COG 0402 (RoHS)	1	C528	T2F	3101054700010	Chip capacitor 47PF J 50V COG 0402 (RoHS)	1	C528	T2F
29	3101050600010	Chip capacitor 6PF B 50V COG 0402 (RoHS)	1	C402	T4F	3101054710010	Chip capacitor 0402 470PF K 50V (RoHS)	1	C402	T4F
30	3101053300000	Chip capacitor 33PF J 50V COG 0402 (RoHS)	1	C411	T4E	3101056800000	Chip capacitor 0402 68PF J 50V(RoHS)	1	C411	T4E

31	3101061000000	Chip capacitor 0603 10PF J 50V (RoHS)	1	C423	T4D	3101060100010	Chip capacitor 1PF B 50V C0G 0603 (RoHS)	1	C423	T4D
32	3101060100010	Chip capacitor 1PF B 50V C0G 0603 (RoHS)	1	C452	T4C	3101060300010	Chip capacitor 3PF B 50V C0G 0603 (RoHS)	1	C452	T4C
33	3101060100010	Chip capacitor 1PF B 50V C0G 0603 (RoHS)	1	C456	T4C	3101060300010	Chip capacitor 3PF B 50V C0G 0603 (RoHS)	1	C456	T4C
34	3101060300010	Chip capacitor 3PF B 50V C0G 0603 (RoHS)	1	C115	T4G	3101060400010	Chip capacitor 4PF B 50V C0G 0603 (RoHS)	1	C115	T4G
35	3101061590010	Chip capacitor 0603 1.5PF B 50V (RoHS)	1	C454	T4C	3101060500010	Chip capacitor 0603 5PF B 50V (RoHS)	1	C454	T4C
36	3101060390000	Chip capacitor 0603 0.3PF B 50V (RoHS)	1	C116	T4G	3101060590010	Chip capacitor 0603 0.5PF B 50V (RoHS)	1	C116	T4G
37	3101060300010	Chip capacitor 3PF B 50V C0G 0603 (RoHS)	1	C425	T5D	3101060900010	Chip capacitor 9PF B 50V C0G 0603 (RoHS)	1	C425	T5D
38	3101060100010	Chip capacitor 1PF B 50V C0G 0603 (RoHS)	1	C451	T3B	3101060900010	Chip capacitor 9PF B 50V C0G 0603 (RoHS)	1	C451	T3B
39	3101060590010	Chip capacitor 0603 0.5PF B 50V (RoHS)	1	C424	T4D	3101060800010	Chip capacitor 8PF B 50V C0G 0603 (RoHS)	1	C424	T4D
40	3101062700010	Chip capacitor 0603 27PF J 50V (RoHS)	1	C429	T4C	3101061020000	Chip capacitor 1000PF K 50V X7R 0603 (RoHS)	1	C429	T4C
41	3101061200000	Chip capacitor 12PF J 50V C0G 0603 (RoHS)	1	C421	T5D	3101062700010	Chip capacitor 0603 27PF J 50V (RoHS)	1	C421	T5D
42	3101060700020	Chip capacitor 0603 7PF B 50V (RoHS)	1	C422	T4D	3101061500010	Chip capacitor 15PF J 50V C0G 0603 (RoHS)	1	C422	T4D
43	3101061010010	Chip capacitor 100PF J 50V C0G 0603(RoHS)	1	C450	T4C	3101062210000	Chip capacitor 0603 220PF J 50V (RoHS)	1	C450	T4C
44	3104071060070	Tantalum capacitor 10UF M 10V (RoHS)	1	C336	B1D	3104081060120	Tantalum capacitor 10UF M 16V (RoHS)	1	C336	B1D
45	3104081560050	Tantalum capacitor 15UF M 10V (RoHS)	1	C652	T5G	3104081560020	Tantalum capacitor 1206 15UF M 10V (RoHS)	1	C652	T5G
46	3210108230010	Chip inductor 23nH J 590mA 0.046ohm (RoHS)	1	L104	T5H	3210108270000	Chip inductor 27nH J 560mA 0.051ohm (RoHS)	1	L104	T5H
47	3210108230010	Chip inductor 23nH J 590mA 0.046ohm(RoHS)	1	L107	T3H	3210108330000	Chip inductor 33nH J 530mA 0.057ohm (RoHS)	1	L107	T3H

48	3210305330000	Chip inductor 33nH J 200mA 0.58ohm(RoHS)	1	L115	T3G	3212105470000	Chip inductor 47nH J 200mA 0.58ohm (RoHS)	1	L115	T3G
49	3212105470000	Chip inductor 47nH J 200mA 0.58ohm(RoHS)	1	L112	T3G	3212105560000	Chip inductor 56nH J 200mA 0.61ohm (RoHS)	1	L112	T3G
50	3213212820010	Chip inductor 82nH J 300mA 0.75Ω(RoHS)	1	L408	B5C	3213212561000	Chip inductor 0.56uH J 325mA 0.75Ω (RoHS)	1	L408	B5C
51	3231351640000	Air-core inductor E2- 0.35*1.6*4TL (RoHS)	1	L501	T3D	3231351650000	Air-core inductor E2-0.35*1.6*5TL (RoHS)	1	L501	T3D
52	3231351640000	Air-core inductor E2- 0.35*1.6*4TL (RoHS)	1	L502	T3E	3231351650000	Air-core inductor E2-0.35*1.6*5TL (RoHS)	1	L502	T3E
53	3231351640000	Air-core inductor E2- 0.35*1.6*4TL (RoHS)	1	L508	T2F	3231351650000	Air-core inductor E2-0.35*1.6*5TL (RoHS)	1	L508	T2F
54	3303210200000	Varactor SS-Mini 7 3.6P 0.3Ω 6V (RoHS)	1	D100	T5H	3304060300010	Varactor VR:15V 26pF/1VR 5.8pF/4VR (RoHS)	1	D100	T5H
55	3303210200000	Varactor 3.6P 0.3Ω 6V (RoHS)	1	D101	T5H	3304060300010	Varactor VR:15V 26pF/1VR 5.8pF/4VR (RoHS)	1	D101	T5H
56	3304060300050	Varactor VR:15V 16.4pF/1VR 5.5pF/4VR (RoHS)	1	D102	T3H	3304060300010	Varactor VR:15V 26pF/1VR 5.8pF/4VR (RoHS)	1	D102	T3H
57	3304060300050	Varactor VR:15V 16.4pF/1VR 5.5pF/4VR (RoHS)	1	D103	T3H	3304060300010	Varactor VR:15V 26pF/1VR 5.8pF/4VR (RoHS)	1	D103	T3H
58	3001052220000	Chip resistor 0402 2.2KΩ J 1/16W(RoHS)	1	R101	T4I	3001052220010	Chip resistor 0402 2.2KΩ F 1/16W(RoHS)	1	R101	T4I
59	3001051820000	Chip resistor 0402 1.8KΩ J 1/16W(RoHS)	1	R303	T4J	3001051820010	Chip resistor 0402 1.8KΩ F 1/16W(RoHS)	1	R303	T4J
60	3001051510010	Chip resistor 0402 150Ω F 1/16W(RoHS)	1	R105	T5G	3001051010000	Chip resistor 0402 100Ω J 1/16W(RoHS)	1	R105	T5G
61	3001056800000	Chip resistor 0402 68Ω J 1/16W(RoHS)	1	R106	T4H	3001051010000	Chip resistor 0402 100Ω J 1/16W(RoHS)	1	R106	T4H
62	3101060500010	Chip capacitor 0603 5PF B 50V (RoHS)	1	C122	T3G	3101060600010	Chip capacitor 6PF B 50V C0G 0603 (RoHS)	1	C122	T3G
63	3101060400010	Chip capacitor 4PF B 50V C0G 0603 (RoHS)	1	C123	T3G	3101060600010	Chip capacitor 6PF B 50V C0G 0603 (RoHS)	1	C123	T3G
64	3101060400010	Chip capacitor 4PF B 50V C0G 0603 (RoHS)	1	C427	T5C	3101060600010	Chip capacitor 6PF B 50V C0G 0603 (RoHS)	1	C427	T5C

65	3101060400010	Chip capacitor 4PF B 50V COG 0603 (RoHS)	1	C428	T5C	3101060600010	Chip capacitor 6PF B 50V COG 0603 (RoHS)	1	C428	T5C
66	3001084790000	Chip resistor 1206 4.7Ω J 1/4W(RoHS)	1	R349	B1D	3001082010000	Chip resistor 1206 200Ω J 1/4W(RoHS)	1	R349	B1D
67	3002996830060	Trimmer resistor 68K ±25% 0.15W (RoHS)	1	VR260	B5H	3002996830040	Trimmer resistor 68KΩ ±30% (RoHS)	1	VR260	B5H
68	3002996830060	Trimmer resistor 68K ±25% 0.15W (RoHS)	1	VR300	T4J	3002996830040	Trimmer resistor 68KΩ ±30% (RoHS)	1	VR300	T4J
69	3303020100070	Switching diode 35V 100mA (RoHS)	1	D401	T4C	3303030800040	Switching diode 35V 100mA 0.8V/10mA (RoHS)	1	D401	T4C
70	3001053930000	Chip resistor 0402 39KΩ J 1/16W(RoHS)	1	R235	T4K	3001054330000	Chip resistor 0402 43KΩ F 1/16W(RoHS)	1	R235	T4K
71	3001058220010	Chip resistor 0402 8.2KΩ F 1/16W(RoHS)	1	R234	T4K	3001058220000	Chip resistor 0402 8.2KΩ J 1/16W(RoHS)	1	R234	T4K
72	3001051030000	Chip resistor 0402 10KΩ J 1/16W(RoHS)	1	R261	B4I	3001058220000	Chip resistor 0402 8.2KΩ J 1/16W(RoHS)	1	R261	B4I
73	3101053910000	Chip capacitor 0402 390PF J 50V(RoHS)	1	C206	T3K	3101052210010	Chip capacitor 220PF K 50V X7R 0402 (RoHS)	1	C206	T3K
74	3101052230000	Chip capacitor 0402 0.022UF K 16V(RoHS)	1	C215	T1K	3101052730000	Chip capacitor 0402 0.027UF K 16V(RoHS)	1	C215	T1K
75	3104086850040	Tantalum capacitor 6.8UF M 10V(RoHS)	1	C101	T4I	3104084750040	Tantalum capacitor 1206 4.7uF K 16V (RoHS)	1	C101	T4I
76	3217106829000	Chip inductor 8.2nH J 700mA 0.115Ω (RoHS)	1	L405	T4E	3210306180000	Chip inductor 18nH J 350mA 0.45ohm (RoHS)	1	L405	T4E
77	NC	NC	0			3001051040000	Chip resistor 0402 100KΩ F 1/16W(RoHS)	1	R507	T2F
78	NC	NC	0			3101050400010	Chip capacitor 0402 4PF B 50V (RoHS)	1	C516	T3E
79	NC	NC	0			3101050400010	Chip capacitor 0402 4PF B 50V (RoHS)	1	C534	T2F
80	NC	NC	0			3101050500010	Chip capacitor 0402 5PF B 50V (RoHS)	1	C519	T2F
81	NC	NC	0			3101051500020	Chip capacitor 15PF J 50V COG 0402 (RoHS)	1	C407	T5E

82	NC	NC	0			3101060500010	Chip capacitor 0603 5PF B 50V (RoHS)	1	C426	T5C
83	NC	NC	0			3101063900000	Chip capacitor 0603 39PF J 50V(RoHS)	1	C420	T5D
84	NC	NC	0			3231351650000	Air-core inductor E2-0.35*1.6*5TL (RoHS)	1	L506	T3F
85	NC	NC	0			3304060300050	Varactor VR:15V 16.4pF/1VR 5.5pF/4VR(RoHS)	1	D505	T2F
86	NC	NC	0			3001061020010	Chip resistor 0603 1KΩ J 1/10W(RoHS)	1	R409	T5F
87	NC	NC	0			3001082010000	Chip resistor 1206 200Ω J 1/4W(RoHS)	1	R348	B1D
88	3001050000000	Chip resistor 0402 0Ω J 1/16W(RoHS)	1	R721	T2K	NC	NC	0		
89	3001051040000	Chip resistor 0402 100KΩ F 1/16W(RoHS)	1	R508	T2F	NC	NC	0		
90	3101050600010	Chip capacitor 6PF B 50V COG 0402 (RoHS)	1	C523	T2F	NC	NC	0		
91	3210306220000	Chip inductor 22nH J 300mA 0.50ohm (RoHS)	1	L503	T3E	NC	NC	0		
92	3231351440000	Air-core inductor E2-0.35*1.4*4TR (RoHS)	1	L507	T2F	NC	NC	0		
93	3304060300050	Varactor VR:15V 16.4pF/1VR 5.5pF/4VR (RoHS)	1	D506	T2F	NC	NC	0		

## TC-610P Parts List 1

Difference between U(3) HDC1200 Ver. and JP ATIS Ver.

TC-610P U(3) HDC1200 Ver.						TC-610P U(3)-JP ATIS Ver.				
No.	Material No.	Description	Qty.	Ref No.	Print No.	Material No.	Description	Qty.	Ref No.	Print No.
1	3001051240000	Chip resistor 0402 120KΩ J 1/16W(RoHS)	1	R229	T4K	3001052730010	Chip resistor 0402 27KΩ F 1/16W(RoHS)	1	R229	T4K
2	3001051830000	Chip resistor 0402 18KΩ J 1/16W(RoHS)	1	R239	T4K	3001052230010	Chip resistor 0402 22KΩ J 1/16W(RoHS)	1	R239	T4K
3	3001054720000	Chip resistor 0402 4.7KΩ J 1/16W(RoHS)	1	R231	B3K	3001051820000	Chip resistor 0402 1.8KΩ J 1/16W(RoHS)	1	R231	T3K
4	3001054740000	Chip resistor 0402 470KΩ J 1/16W(RoHS)	1	R211	T4K	3001052740000	Chip resistor 0402 270KΩ J 1/16W(RoHS)	1	R211	T3J
5	3101051820000	Chip capacitor 0402 1800PF K 50V(RoHS)	1	C233	T4K	3101056820000	Chip capacitor 0402 6800PF K 25V(RoHS)	1	C233	T4K
6	3101052230000	Chip capacitor 0402 0.022UF K 16V(RoHS)	1	C215	B4K	3101053930000	Chip capacitor 0402 0.039UF K 10V(RoHS)	1	C215	T1K
7	3101054730000	Chip capacitor 0402 0.047UF K 10V(RoHS)	1	C205	T2K	3101053330000	Chip capacitor 0402 0.047UF K 10V(RoHS)	1	C205	T3K
8	3303020100070	Switching diode 35V 100mA (RoHS)	1	D401	T3F	3303030800040	Switching diode 35V 100mA 0.92V/100mA (RoHS)	1	D401	T4C
9	3303210200000	Varactor 3.6P 0.3Ω 6V (RoHS)	1	D100	T5H	3304060300050	Varactor VR:15V 16.4pF/1VR 5.5pF/4VR (RoHS)	1	D100	T5H
10	3303210200000	Varactor 3.6P 0.3Ω 6V (RoHS)	1	D101	T4H	3304060300050	Varactor VR:15V 16.4pF/1VR 5.5pF/4VR (RoHS)	1	D101	T5H
11	3399990000080	Zener diode 6.8V (RoHS)	1	D430	T4I	3399990000080	Zener diode 6.8V (RoHS)	1	D430	B5D
12	3001053930000	Chip resistor 0402 39KΩ J 1/16W(RoHS)	1	R235	T4K	3001055630000	Chip resistor 0402 56KΩ J 1/16W(RoHS)	1	R235	T4K
13	3101052720000	Chip capacitor 0402 2700PF K 50V(RoHS)	1	C243	T3K	3101051020010	Chip capacitor 1000PF K 50V X7R 0402 (RoHS)	1	C243	T4K



14	3101058220000	Chip capacitor 0402 8200PF K 50V(RoHS)	1	C244	T4D	3101055620010	Chip capacitor 5600PF K 25V X7R 0402(RoHS)	1	C244	T4K
15	3101053910000	Chip capacitor 0402 390PF J 50V(RoHS)	1	C206	T2J	3101061010010	Chip capacitor 100PF J 50V C0G 0603(RoHS)	1	C206	T3K
16	NC	NC	0	R210	T3K	3001057520000	Chip resistor 0402 7.5KΩ J 1/16W(RoHS)	1	R210	T3K

## Adjustment Description

### Required Test Instruments:

Communication Test Set (HP8921)	1 set
10V/3A regulated DC power supply	1 set
Digital Voltmeter	1 set
Ammeter	1 set

### Preparation

Place the board to be tested on the test fixture (please ensure good connection between each test point and the fixture), and connect the board to a power supply.

### Adjustment Procedures

#### 1. Operations before Adjustment

##### 1) PCB adjustment:

Before the PCB arrives each work station for specification inspection, programs must be programmed and EEPROM must be initialized by the profiles (recording with test framework / initializing with programming software or by wired clone). If any adjustment is required, connect the programming cable, and perform PC adjustment in the adjustment mode.

##### 2) Radio Tuning

- a) Rotate the **Channel Selector Knob** to channel 1, and turn on the radio with **PTT** and **SK2** held down for above 2 seconds. Then the LED glows orange to indicate that the radio enters Adjustment Mode. After you release the keys, the radio enters Tuning Mode and goes to an item in Tx Group (preset power). At this time, red LED glows. Then adjust the parameters as described below.
- b) Or you may connect the programming cable to the radio for real-time adjustment through PC.

## 2. Description of Adjustment Items

TC-610P V Adjustment Items											
CH	Frequency	Wide Band					Narrow Band				
		Point 1	Point 2	Point 3	Point 4	Point 5	Point 1	Point 2	Point 3	Point 4	Point 5
Tx Section											
1	Preset RF Power			Y							
2	Tx Low Power	Y	Y	Y	Y	Y					
3	Reserved CH (not tune)										
4	Tx High Power	Y	Y	Y	Y	Y					
5	CDCSS Deviation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
6	CTCSS (67Hz) Deviation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	CTCSS (151.8Hz) Deviation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
8	CTCSS (254.1Hz) Deviation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
9	VOX Level 1			Y							
10	VOX Level 2			Y							
11	VOX Level 3			Y							
12	VOX Level 4			Y							
13	VOX Level 5			Y							
14	Tx Low Voltage Threshold			Y							
Rx Section											
1	Carrier Squelch Level 1 On	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	Carrier Squelch Level 5 On	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	Carrier Squelch Level 9 On	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4	Carrier Squelch Level 1 Off	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5	Carrier Squelch Level 5 Off	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
6	Carrier Squelch Level 9 Off	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	Rx Low Battery Threshold			Y							
8	Bandpass filter	Y	Y	Y	Y	Y					
	Note: Y indicates valid adjustment frequencies. The rest channels are blank and have no adjustment item										

### 1) To switch between Tx group and Rx group

Rotate the **Channel Selector Knob** to CH16 and long press **PTT** to switch between Tx group and Rx group. If the LED glows red, Tx group is selected; if the LED glows green, Rx group is selected.

The LED solidly glows red for adjustment of Tx group items.

The LED solidly glows green for adjustment of Rx group items.

### 2) Wide/Narrow Bandwidth Switch and Frequency Switch in an Adjustment Item:

In an adjustment item, long press **PTT** to switch between wide and narrow bandwidth. The default adjustment point is the 1st frequency of current bandwidth. Short press **PTT** to switch among frequencies.

### 3) Adjustment Items Include:

Tx group items:

Tx frequency tolerance, VCO lock voltage, max deviation, modulation sensitivity (adjusted through hardware out of Adjustment Mode), Tx low power, Tx high power, CDCSS waveform, CDCSS deviation, CTCSS deviation (low), CTCSS deviation (medium), CTCSS deviation (high), Tx low voltage threshold (adjusted through software in Adjustment Mode).

Rx Group Items:

VCO lock voltage (adjusted outside Adjustment Mode), Squelch, Rx bandpass filter, Rx low voltage threshold.

### 3. Specific Operations and Requirements

(1) Conventional Adjustment Items (outside the Adjustment Mode): Tx frequency tolerance, VCO lock voltage, max deviation, modulation sensitivity.

Note: Channels 1, 2 and 3 are preset to low, medium and high frequency respectively in wide band, and channels 4, 5 and 6 are preset to low, medium and high frequency respectively in narrow band.

Be sure to connect antenna or load before adjustment.

#### TC-610P VHF

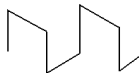
##### (1) Outside the Adjustment Mode

Item	Condition	Test		Adjustment		Specifications / Remarks
		Test Instrument	Test point	Part	Method	
Tx Frequency Tolerance	Rotate the <b>Channel Selector</b> knob to CH2 and press <b>PTT</b> to transmit.	Communication Test Set	Antenna	VR300	Adjust VR300 with ceramic tuning tool to control the center frequency within the error range.	≤150Hz
Tx VCO Lock Voltage	Rotate the <b>Channel Selector Knob</b> to CH3 and press <b>PTT</b> to transmit.	Digital Voltmeter	CV	TC100	Adjust TC100 with ceramic tuning tool until the lock voltage meets the requirements.	≥2.9V
	Rotate the <b>Channel Selector</b> knob to CH1 and press <b>PTT</b> to transmit.				Check	≥0.8

Rx VCO Lock Voltage		Rotate the <b>Channel Selector Knob</b> to CH3.			TC101	Adjust TC101 with ceramic tuning tool until the lock voltage meets the requirements.	2.7-2.9V	
		Rotate the <b>Channel Selector Knob</b> to CH1.				Check	≥0.8	
Max. deviation	Wide	Rotate the <b>Channel Selector Knob</b> to CH1, CH2 and CH3, press <b>PTT</b> to transmit.	Communication Test Set BPF: <20Hz~15kHz AF: 1kHz 150mV	Antenna Earpiece Jack	VR200	Adjust VR200 with ceramic tuning tool until deviation satisfies the requirements.	3.5-4.1KHz (radio for German needs 2.6-3.1KHz)	
	Narrow	Rotate the <b>Channel Selector Knob</b> to CH4, CH5 and CH6, press <b>PTT</b> to transmit.				Check	1.7-2.3KHz (radio for German needs ≥1.3 KHz)	
Modulation Sensitivity	Wide	Rotate the <b>Channel Selector Knob</b> to CH1, CH2 and CH3, press <b>PTT</b> to transmit.	Communication Test Set BPF: 0.3 KHz-3KHz AF: 1KHz				Adjust output signal of the communication test set, until frequency deviation gets 3.0KHz.	6-16mV
	Narrow	Rotate the <b>Channel Selector Knob</b> to CH4, CH5 and CH6, press <b>PTT</b> to transmit.					Adjust output signal of the communication test set, until frequency deviation gets 1.5KHz.	6-16mV

2) Adjustment in the mode (Note: be sure to connect antenna or load before adjustment))

Item	Condition	Test		Adjustment		Specifications / Remarks
		Test Instrument	Test point	Part	Method	
Tx Power	High	Communication Test Set / Ammeter	Antenna Connect- or	SK1 SK2	Press <b>SK1</b> or <b>SK2</b> to adjust the output power, and rotate the <b>Channel Selector Knob</b> to save it.	4.6-5.0W I≤1.7A (radio for German needs 2.3-2.7W I≤1.7A)

Tx Power	Low	Rotate the <b>Channel Selector Knob</b> to CH2 and press <b>PTT</b> to enable this function at the low frequency.				Press <b>SK1</b> or <b>SK2</b> to adjust the output power, and rotate the <b>Channel Selector Knob</b> to save it.	2W±0.2W I≤1.2A (radio for German needs 0.8-1.2W I≤1.2A)
		Short press <b>PTT</b> to switch among frequencies (refer to the table of Adjustment Items).					
CDCSS Waveform		Rotate the <b>Channel Selector Knob</b> to CH5 and press <b>PTT</b> to enable this function. Select the wide band and low frequency.			VR260	Adjust VR260 with ceramic tuning tool and make the waveform similar to square waveform.	
		Short press <b>PTT</b> to switch among frequencies; and long press <b>PTT</b> to switch between wide/narrow band.				Check	
CDCSS Deviation	Wide	Rotate the <b>Channel Selector Knob</b> to CH5 and press <b>PTT</b> to enable this function. Select the wide band and low frequency.	Communication Test Set BPF: <20Hz~300Hz	Antenna	VR601 SK1 SK2	Adjust VR601 with ceramic tuning tool to check each frequency. Enter the Adjustment Mode if necessary, and press <b>SK1</b> or <b>SK2</b> to perform fine tuning until the CDCSS deviation meets the requirements.	500-1000Hz
		Press <b>PTT</b> to switch among frequencies (medium-low, medium, medium-high and high).					
	Narrow	Long press <b>PTT</b> to enter the narrow band and select low frequency.				Enter the Adjustment Mode if necessary, and press <b>SK1</b> or <b>SK2</b> to perform fine tuning until the CDCSS deviation meets the requirements.	300-550Hz
		Press <b>PTT</b> to switch among frequencies (medium-low, medium, medium-high and high).					

CTCSS Deviation	Wide	Rotate the <b>Channel Selector Knob</b> to CH6, CH7 and CH8, and set the CTCSS to low, medium and high frequencies. Press <b>PTT</b> to enable this function, and select the wide band. Short press <b>PTT</b> to switch among frequencies on each channel.	Communication Test Set BPF: <20Hz-300Hz	Antenna	VR601 SK1 SK2	Adjust VR601 with ceramic tuning tool to check each frequency. Enter the Adjustment Mode if necessary, and press <b>SK1</b> or <b>SK2</b> to perform fine tuning until the CTCSS deviation meets the requirements.	500-1000Hz
	Narrow	Rotate the <b>Channel Selector Knob</b> to CH6, CH7 and CH8, long press <b>PTT</b> to enter the narrow band, and short press <b>PTT</b> to switch among frequencies.				Enter the Adjustment Mode if necessary, and press <b>SK1</b> or <b>SK2</b> to perform fine tuning until the CTCSS deviation meets the requirements.	300-550Hz
VOX		Rotate the <b>Channel Selector Knob</b> to CH9 and select VOX Level 1. Press <b>SK1</b> or <b>SK2</b> to enable this function.	Communication Test Set BPF: <20Hz-15kHz AF: 1kHz 10mV	Antenna Earpiece Jack	SK1 SK2	Apply <b>SK1</b> or <b>SK2</b> to perform adjustment, and rotate the <b>Channel Selector Knob</b> to save it after one-point adjustment.	3KHz
		Rotate the <b>Channel Selector Knob</b> to CH10 and select VOX Level 2. Press <b>SK1</b> or <b>SK2</b> to enable this function.	Communication Test Set BPF: <20Hz-15kHz AF: 1kHz 6mV			Apply <b>SK1</b> or <b>SK2</b> to perform adjustment, and rotate the <b>Channel Selector Knob</b> to save it after one-point adjustment.	1.5KHz
		Rotate the <b>Channel Selector Knob</b> to CH11 and select VOX Level 3. Press <b>SK1</b> or <b>SK2</b> to enable this function.	Communication Test Set BPF: <20Hz-15kHz AF: 1kHz 4.5mV			Apply <b>SK1</b> or <b>SK2</b> to perform adjustment, and rotate the <b>Channel Selector Knob</b> to save it after one-point adjustment.	

VOX		Rotate the <b>Channel Selector Knob</b> to CH12 and select VOX Level 4. Press <b>SK1</b> or <b>SK2</b> to enable this function.	Communication Test Set BPF: <20Hz-15kHz AF: 1kHz 3.5mV	Antenna Earpiece Jack	SK1	Apply <b>SK1</b> or <b>SK2</b> to perform adjustment, and rotate the <b>Channel Selector Knob</b> to save it after one-point adjustment.	
		Rotate the <b>Channel Selector knob</b> to CH13 and select VOX Level 5. Press <b>SK1</b> or <b>SK2</b> to enable this function.	Communication Test Set BPF: <20Hz-15kHz AF: 1kHz 2mV		SK2	Apply <b>SK1</b> or <b>SK2</b> to perform adjustment, and rotate the <b>Channel Selector Knob</b> to save it after one-point adjustment.	
TX Low Voltage Threshold			Digital Voltmeter	Power Supply Port	Power Supply	Adjust the output voltage and check the emergency level.	5.97V-6.92V (when $\leq 6.92V$ , the LED flashes; and when $\leq 5.97V$ , the alert tone sounds to indicate transmission inhibition.)
RX Sensitivity (Bandpass)		Rotate the <b>Channel Selector Knob</b> to CH8 and select the low frequency.	Communication Test Set SSG: -119dBm MOD: 1KHz DEV: 3.0KHz Filter: 0.3-3KHz	Antenna Earpiece Jack	SK1 SK2	Check the bandpass waveform. Apply <b>SK1</b> or <b>SK2</b> to perform adjustment, and rotate the <b>Channel Selector Knob</b> to save it after five-point adjustment.	Rotate the <b>Volume Control Knob</b> to a proper level until the output amplitude is not limited. SINAD: $\geq 12dB$
		Short press <b>PTT</b> to switch among frequencies.					
Squelch On	Wide	Rotate the <b>Channel Selector Knob</b> to CH1, and set it to SQL 1 On. Press <b>SK1</b> or <b>SK2</b> to enable this function. Channel spacing: Wide; Frequency: Low. Short press <b>PTT</b> to switch among frequencies.	Communication Test Set SSG: -122dBm MOD: 1KHz DEV: 3KHz Filter: 0.3-3KHz	Antenna Earpiece Jack	SK1 SK2	Adjust the output signals of SSG to the squelch level. Rotate the <b>Channel Selector Knob</b> to save the value after five-point adjustment.	Squelch level (1): $-122\pm 1dB$



Squelch On	Wide	Rotate the <b>Channel Selector Knob</b> to CH2, and set to SQL 5 On. Press <b>SK1</b> or <b>SK2</b> to enable this function. Channel spacing: Wide; Frequency: Low. Short press <b>PTT</b> to switch among frequencies.	Communication Test Set SSG: -119dB MOD: 1KHz DEV: 3KHz Filter: 0.3-3KHz	Antenna Earpiece Jack	SK1 SK2	Adjust the output signals of SSG to the squelch level. Rotate the <b>Channel Selector Knob</b> to save the value after five-point adjustment.	Squelch level (5): -119±1dB
		Rotate the <b>Channel Selector</b> knob to CH3, and set to SQL 9 On. Press <b>SK1</b> or <b>SK2</b> to enable this function. Channel spacing: Wide; Frequency: Low. Short press <b>PTT</b> to switch among frequencies.	Communication Test Set SSG: -114dBm MOD: 1KHz DEV: 3KHz Filter: 0.3-3KHz				Squelch level (9): -114±1dB
	Narrow	Long press <b>PTT</b> on the above channels to enter the narrow band. Press <b>SK1</b> or <b>SK2</b> to enable this function, and short press <b>PTT</b> to switch among frequencies.	Communication Test Set SSG: -121dBm MOD: 1KHz DEV: 1.5KHz Filter: 0.3-3KHz			Refer to the above.	Squelch level (1): -121±1dB
			Communication Test Set SSG: -118dBm MOD: 1KHz DEV: 1.5KHz Filter: 0.3-3KHz				Squelch level (5): -118±1dB
			Communication Test Set SSG: -122dBm MOD: 1KHz DEV: 1.5KHz Filter: 0.3-3KHz				Squelch level (9): -113±1dB

Squelch Off	Wide	Rotate the <b>Channel Selector Knob</b> to CH4, and set to SQL 1 Off. Press <b>SK1</b> or <b>SK2</b> to enable this function. Channel spacing: Wide; Frequency: Low. Short press <b>PTT</b> to switch among frequencies.	Communication Test Set SSG: -124dBm MOD: 1KHz DEV: 3KHz Filter: 0.3-3KHz	Antenna Earpiece Jack	SK1 SK2	Adjust the output signals of SSG to the squelch level. Rotate the <b>Channel Selector Knob</b> to save the value after five-point adjustment.	Squelch level (1): -124±1dB
		Rotate the <b>Channel Selector knob</b> to CH5, and set to SQL 5 Off. Press <b>SK1</b> or <b>SK2</b> to enable this function. Channel spacing: Wide; Frequency: Low. Short press <b>PTT</b> to switch among frequencies.	Communication Test Set SSG: -121dBm MOD: 1KHz DEV: 3KHz Filter: 0.3-3KHz				Squelch level (5): -121±1dB
		Rotate the <b>Channel Selector Knob</b> to CH6, and set it to SQL 9 Off. Press <b>SK1</b> or <b>SK2</b> to enable this function. Channel spacing: Wide; Frequency: Low. Short press <b>PTT</b> to switch among frequencies.	Communication Test Set SSG: -116dBm MOD: 1KHz DEV: 3KHz Filter: 0.3-3KHz				Squelch level (9): -116±1dB
Squelch Off	Narrow	Long press <b>PTT</b> on the above channels to enter the narrow band. Press <b>SK1</b> or <b>SK2</b> to enable this function, and short press <b>PTT</b> to switch among frequencies.	Communication Test Set SSG: -123dBm MOD: 1KHz DEV: 1.5KHz Filter: 0.3-3KHz	Antenna Earpiece Jack	SK1 SK2	Adjust the output signals of SSG to the squelch level. Rotate the <b>Channel Selector Knob</b> to save the value after five-point adjustment.	Squelch level (1): -123±1dB
			Communication Test Set SSG: -120dBm MOD: 1KHz DEV: 1.5KHz Filter: 0.3-3KHz				Squelch level (5): -120±1dB
			Communication Test Set SSG: -115dBm MOD: 1KHz DEV: 1.5KHz Filter: 0.3-3KHz				Squelch level (9): -115±1dB

RX Low Voltage Threshold			Digital Voltmeter	Power Supply Port	Power Supply	Adjust the output voltage and check the emergency level (red LED flashes and alert tone sounds).	≤6.56V
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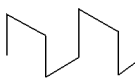
## TC-610P UHF

### (1) Outside the Adjustment Mode

Item	Condition	Test		Adjustment		Specifications / Remarks
		Test Instrument	Test point	Part	Method	
Tx Frequency Tolerance	Rotate the <b>Channel Selector Knob</b> to CH2 and press <b>PTT</b> to transmit.	Communication Test Set	Antenna	VR300	Adjust VR300 with ceramic tuning tool to control the center frequency within the error range.	≤150Hz
Tx VCO Lock Voltage	Rotate the <b>Channel Selector Knob</b> to CH1 and press <b>PTT</b> to transmit.	Digital Voltmeter	CV	TC100	Adjust TC100 with ceramic tuning tool until the lock voltage meets the requirements.	0.7V (+0.1V)
	Rotate the <b>Channel Selector Knob</b> to CH3 and press <b>PTT</b> to transmit.				Check	≤4V
Rx VCO Lock Voltage	Rotate the <b>Channel Selector Knob</b> to CH1.			TC101	Adjust TC101 with ceramic tuning tool until the lock voltage meets the requirements.	0.7V (+0.1V)
	Rotate the <b>Channel Selector Knob</b> to CH3.				Check	≤4V
Max. deviation	Wide Rotate the <b>Channel Selector Knob</b> to CH1, CH2 and CH3, press <b>PTT</b> to transmit.	Communication Test Set BPF: 0.3 KHz-3KHz AF: 1KHz 150mV	Antenna Earpiece Jack	VR200	Adjust VR200 with ceramic tuning tool until deviation satisfies the requirements.	3.5-4.1kHz
	Narrow Rotate the <b>Channel Selector Knob</b> to CH4, CH5 and CH6, press <b>PTT</b> to transmit.				Check	1.6-2.2kHz

Modulation Sensitivity	Wide	Rotate the <b>Channel Selector Knob</b> to CH1, CH2 and CH3, press <b>PTT</b> to transmit.	Communication Test Set BPF: 0.3 KHz-3KHz AF: 1KHz	Antenna Earpiece Jack		Adjust output signal of the communication test set, until frequency deviation gets 3.0KHz.	8-18mV
	Narrow	Rotate the <b>Channel Selector Knob</b> to CH4, CH5 and CH6, press <b>PTT</b> to transmit.				Adjust output signal of the communication test set, until frequency deviation gets 1.5KHz.	8-18mV

2) Adjustment in the mode (Note: be sure to connect antenna or load before adjustment)

Item		Condition	Test		Adjustment		Specifications / Remarks
			Test Instrument	Test point	Part	Method	
Tx Power	High	Rotate the <b>Channel Selector Knob</b> to CH4 and press <b>PTT</b> to enable this function at low frequency.	Communication Test Set / Ammeter	Antenna Connector	SK1 SK2	Press <b>SK1/SK2</b> to adjust the output power, and rotate the <b>Channel Selector Knob</b> to save it.	4.5-5W  I≤1.7A
		Short press <b>PTT</b> to switch among frequencies (refer to the table of Adjustment Items).					
Tx Power	Low	Rotate the <b>Channel Selector Knob</b> to CH2 and press <b>PTT</b> to enable this function at the low frequency.	Communication Test Set / Ammeter	Antenna Connector	SK1 SK2	Press <b>SK1/SK2</b> to adjust the output power, and rotate the <b>Channel Selector Knob</b> to save it.	2W±0.3W  I≤1.2A
		Short press <b>PTT</b> to switch among frequencies (refer to the table of Adjustment Items).					
CDCSS Deviation		Rotate the <b>Channel Selector Knob</b> to CH5 and press <b>PTT</b> to enable this function. Select the wide band and low frequency.	Communication Test Set BPF: <20Hz~300Hz	Antenna	VR 260	Adjust VR260 with ceramic tuning tool and make the waveform similar to square waveform.	
		Short press <b>PTT</b> to switch among frequencies; and long press <b>PTT</b> to switch between wide/narrow bands.					

CDCSS Deviation	Wide	Rotate the <b>Channel Selector Knob</b> to CH5 and press <b>PTT</b> to enable this function. Select the wide band and low frequency.	Communication Test Set BPF: <20Hz~300Hz	Antenna	VR 601 SK1 SK2	Adjust VR601 with ceramic tuning tool to check each frequency. Enter the Adjustment Mode if necessary, and press <b>SK1</b> or <b>SK2</b> to perform fine tuning until the CDCSS deviation meets the requirements.	500-900Hz (550-650Hz is recommended)
		Press <b>PTT</b> to switch among frequencies (medium-low, medium, medium-high and high).					
	Narrow	Long press <b>PTT</b> to enter the narrow band and select low frequency.				Enter the Adjustment Mode if necessary, and press <b>SK1</b> or <b>SK2</b> to perform fine tuning until the CDCSS deviation meets the requirements.	300-500Hz
		Press <b>PTT</b> to switch among frequencies (medium-low, medium, medium-high and high).					
CTCSS Deviation	Wide	Rotate the <b>Channel Selector Knob</b> to CH6, CH7 and CH8, and set their CTCSS to low, medium and high respectively. Press <b>PTT</b> to enable this function, and select the wide band. Short press <b>PTT</b> to switch among frequencies on each channel.	Communication Test Set BPF: <20Hz-300Hz	Antenna	VR 601 SK1 SK2	Adjust VR601 with ceramic tuning tool to check each frequency. Enter the Adjustment Mode if necessary, and press <b>SK1</b> or <b>SK2</b> to perform fine tuning until the CTCSS deviation meets the requirements.	500-900Hz (550-650Hz is recommended)
CTCSS Deviation	Narrow	Rotate the <b>Channel Selector Knob</b> to CH6, CH7 and CH8, long press <b>PTT</b> to enter the narrow band, and short press <b>PTT</b> to switch among frequencies.	Communication Test Set BPF: <20Hz-300Hz	Antenna	VR 601 SK1 SK2	Enter the Adjustment Mode if necessary, and press <b>SK1</b> or <b>SK2</b> to perform fine tuning until the CDCSS deviation meets the requirements.	300-500Hz

ATIS / HDC1200 Deviation	Wide	Rotate the <b>Channel Selector Knob</b> to CH5 and press <b>PTT</b> to enable this function. Select the wide band and low frequency.	Communication Test Set BPF: <20Hz-300Hz	Antenna	SK1 SK2	Press <b>SK1</b> or <b>SK2</b> to adjust MSK deviation, and rotate the <b>Channel Selector Knob</b> to save it.	3KHz
	Narrow	Press <b>PTT</b> to switch among frequencies (medium-low, medium, medium-high and high).				Press <b>SK1</b> or <b>SK2</b> to adjust MSK deviation, and rotate the <b>Channel Selector Knob</b> to save it.	1..5KHz
VOX		Rotate the <b>Channel Selector Knob</b> to CH9 and select VOX Level 1. Press <b>SK1</b> or <b>SK2</b> to enable this function.	Communication Test Set BPF: <20Hz-15kHz AF: 1kHz 10mV	Antenna Earpiece Jack	SK1 SK2	Apply <b>SK1</b> or <b>SK2</b> to perform adjustment, and rotate the <b>Channel Selector Knob</b> to save it after one-point adjustment.	
		Rotate the <b>Channel Selector Knob</b> to CH10 and select VOX Level 2. Press <b>SK1</b> or <b>SK2</b> to enable this function.	Communication Test Set BPF: <20Hz-15kHz AF: 1kHz 6mV			Apply <b>SK1</b> or <b>SK2</b> to perform adjustment, and rotate the <b>Channel Selector Knob</b> to save it after one-point adjustment.	

VOX	Rotate the <b>Channel Selector Knob</b> to CH11 and select VOX Level 3. Press <b>SK1</b> or <b>SK2</b> to enable this function.	Communication Test Set BPF: <20Hz-15kHz AF: 1kHz 4.5mV	Antenna Earpiece Jack	SK1 SK2	Apply <b>SK1</b> or <b>SK2</b> to perform adjustment, and rotate the <b>Channel Selector Knob</b> to save it after one-point adjustment.	
	Rotate the <b>Channel Selector Knob</b> to CH12 and select VOX Level 4. Press <b>SK1</b> or <b>SK2</b> to enable this function.	Communication Test Set BPF: <20Hz-15kHz AF: 1kHz 3.5mV			Apply <b>SK1</b> or <b>SK2</b> to perform adjustment, and rotate the <b>Channel Selector Knob</b> to save it after one-point adjustment.	
	Rotate the <b>Channel Selector Knob</b> to CH13 and select VOX Level 5. Press <b>SK1</b> or <b>SK2</b> to enable this function.	Communication Test Set BPF: <20Hz-15kHz AF: 1kHz 2mV			Apply <b>SK1</b> or <b>SK2</b> to perform adjustment, and rotate the <b>Channel Selector knob</b> to save it after one-point adjustment.	
TX Low Voltage Threshold		Digital Voltmeter	Power Supply Port	Power Supply	Adjust the output voltage and check the emergency level.	5.97V-6.92V (when ≤6.92V, the LED flashes; and when ≤5.97V, the alert tone sounds to indicate transmission inhibition.)
RX Sensitivity (Bandpass)	Rotate the <b>Channel Selector Knob</b> to CH8 and select the low frequency.	Communication Test Set SSG: -119dBm MOD: 1KHz DEV: 3.0KHz Filter: 0.3-3KHz	Antenna Earpiece Jack	SK1 SK2	Check the bandpass waveform. Apply <b>SK1</b> or <b>SK2</b> to perform adjustment, and rotate the <b>Channel Selector Knob</b> to save it after five-point adjustment.	Rotate the <b>Volume Control Knob</b> to a proper level until the output amplitude is not limited. SINAD: ≥12dB.
	Short press <b>PTT</b> to switch among frequencies.					

Squelch On	Wide	Rotate the <b>Channel Selector Knob</b> to CH1, and set it to SQL 1 On. Press <b>SK1</b> or <b>SK2</b> to enable this function. Channel spacing: Wide; Frequency: Low. Short press <b>PTT</b> to switch among frequencies.	Communication Test Set SSG: -122dBm MOD: 1KHz DEV: 3KHz Filter: 0.3-3KHz	Antenna Earpiece Jack	SK1 SK2	Adjust the output signals of SSG to the squelch level.  Rotate the <b>Channel Selector Knob</b> to save the value after five-point adjustment.	Squelch level (1): -122±1dB
		Rotate the <b>Channel Selector Knob</b> to CH2, and set to SQL 5 On. Press <b>SK1</b> or <b>SK2</b> to enable this function. Channel spacing: Wide; Frequency: Low. Short press <b>PTT</b> to switch among frequencies.	Communication Test Set SSG:-119dB MOD: 1KHz DEV: 3KHz Filter: 0.3-3KHz				Squelch level (5): -119±1dB
		Rotate the <b>Channel Selector knob</b> to CH3, and set to SQL 9 On. Press <b>SK1</b> or <b>SK2</b> to enable this function. Channel spacing: Wide; Frequency: Low. Short press <b>PTT</b> to switch among frequencies.	Communication Test Set SSG: -114dBm MOD: 1KHz DEV: 3KHz Filter: 0.3-3KHz				Squelch level (9): -114±1dB
	Narrow	Long press <b>PTT</b> on the above channels to enter the narrow band. Press <b>SK1</b> or <b>SK2</b> to enable this function, and short press <b>PTT</b> to switch between frequencies.	Communication Test Set SSG: -121dBm MOD: 1KHz DEV: 1.5KHz Filter: 0.3-3KHz			Refer to the above.	Squelch level (1): -121±1dB
			Communication Test Set SSG: -118dBm MOD: 1KHz DEV: 1.5KHz Filter: 0.3-3KHz				Squelch level (5): -118±1dB



			Communication Test Set SSG: -113dBm MOD: 1KHz DEV: 1.5KHz Filter: 0.3-3KHz				Squelch level (9): -113±1dB
Squelch Off	Wide	Rotate the Channel Selector Knob to CH4, and set to SQL 1 Off. Press SK1 or SK2 to enable this function. Channel spacing: Wide; Frequency: Low. Short press PTT to switch among frequencies.	Communication Test Set SSG: -124dBm MOD: 1KHz DEV: 3KHz Filter: 0.3-3KHz	Antenna Earpiece Jack	SK1 SK2	Adjust the output signals of SSG to the squelch level. Rotate the Channel Selector Knob to save the value after five-point adjustment.	Squelch level (1): -124±1dB
		Rotate the Channel Selector Knob to CH5, and set to SQL 5 Off. Press SK1 or SK2 to enable this function. Channel spacing: Wide; Frequency: Low. Short press PTT to switch among frequencies.	Communication Test Set SSG: -121dBm MOD: 1KHz DEV: 3KHz Filter: 0.3-3KHz				Squelch level (5): -121±1dB
		Rotate the Channel Selector Knob to CH6, and set it to SQL 9 Off. Press SK1 or SK2 to enable this function. Channel spacing: Wide; Frequency: Low. Short press PTT to switch among frequencies.	Communication Test Set SSG: -116dBm MOD: 1KHz DEV: 3KHz Filter: 0.3-3KHz				Squelch level (9): -116±1dB
	Narrow	Long press <b>PTT</b> on the above channels to enter the narrow band. Press <b>SK1</b> or <b>SK2</b> to enable this function, and short press <b>PTT</b> to switch among frequencies.	Communication Test Set SSG: -123dBm MOD: 1KHz DEV: 1.5KHz Filter: 0.3-3KHz	Antenna Earpiece Jack	SK1 SK2	Adjust the output signals of SSG to the squelch level. Rotate the Channel Selector Knob to save the value after five-point adjustment.	Squelch level (1): -123±1dB
			Communication Test Set SSG: -120dBm MOD: 1KHz DEV: 1.5KHz Filter: 0.3-3KHz				Squelch level (5): -120±1dB

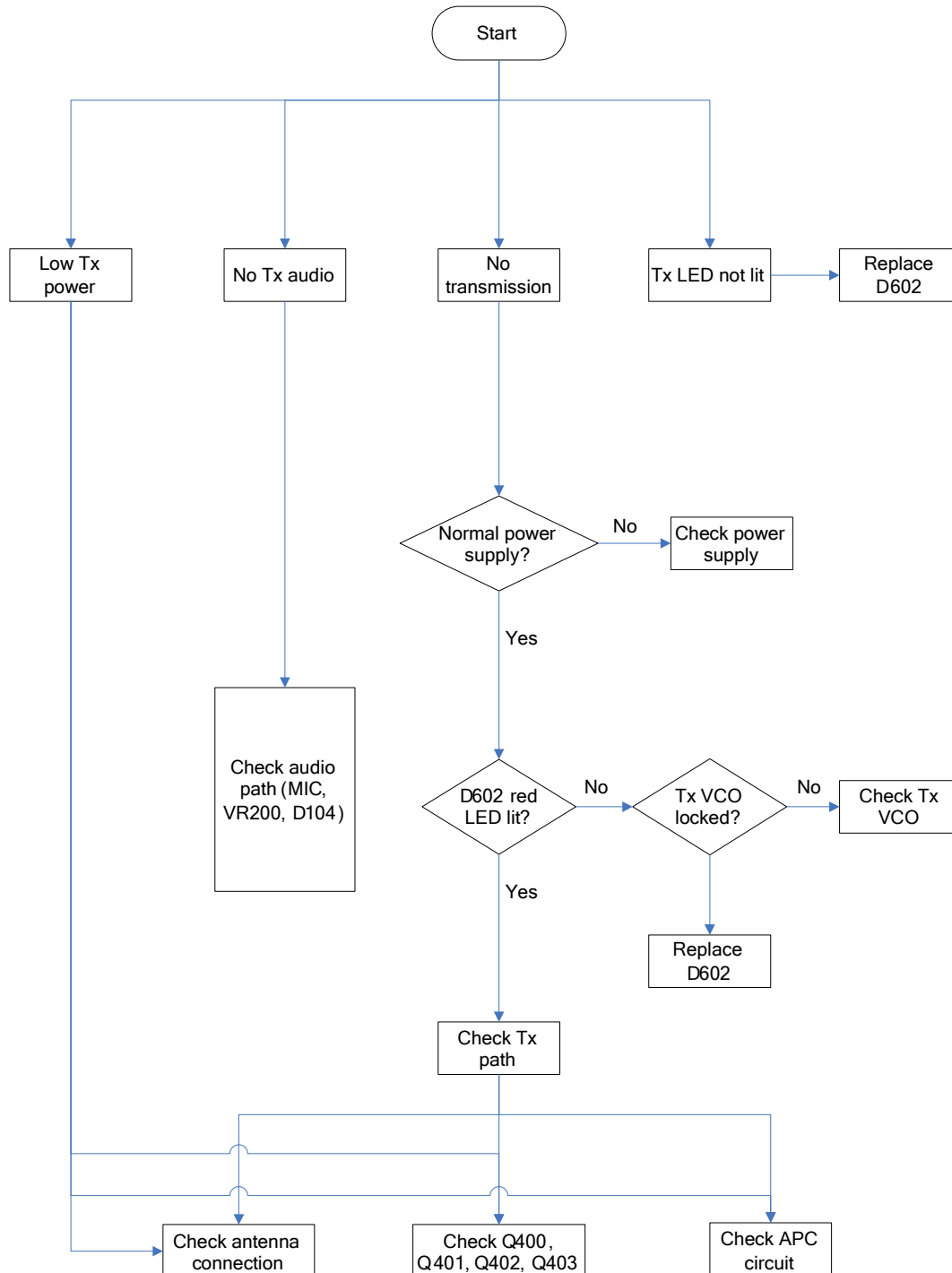
			Communication Test Set SSG: -115dBm MOD: 1KHz DEV: 1.5KHz Filter: 0.3-3KHz				Squelch level (9): -115±1dB
RX Low Voltage Threshold			Digital Voltmeter	Power Supply Port	Power Supply	Adjust the output voltage and check the emergency level (red LED flashes and alert tone sounds).	≤6.56V

**Appendix: Reference Value for TC-610P Battery Strength**

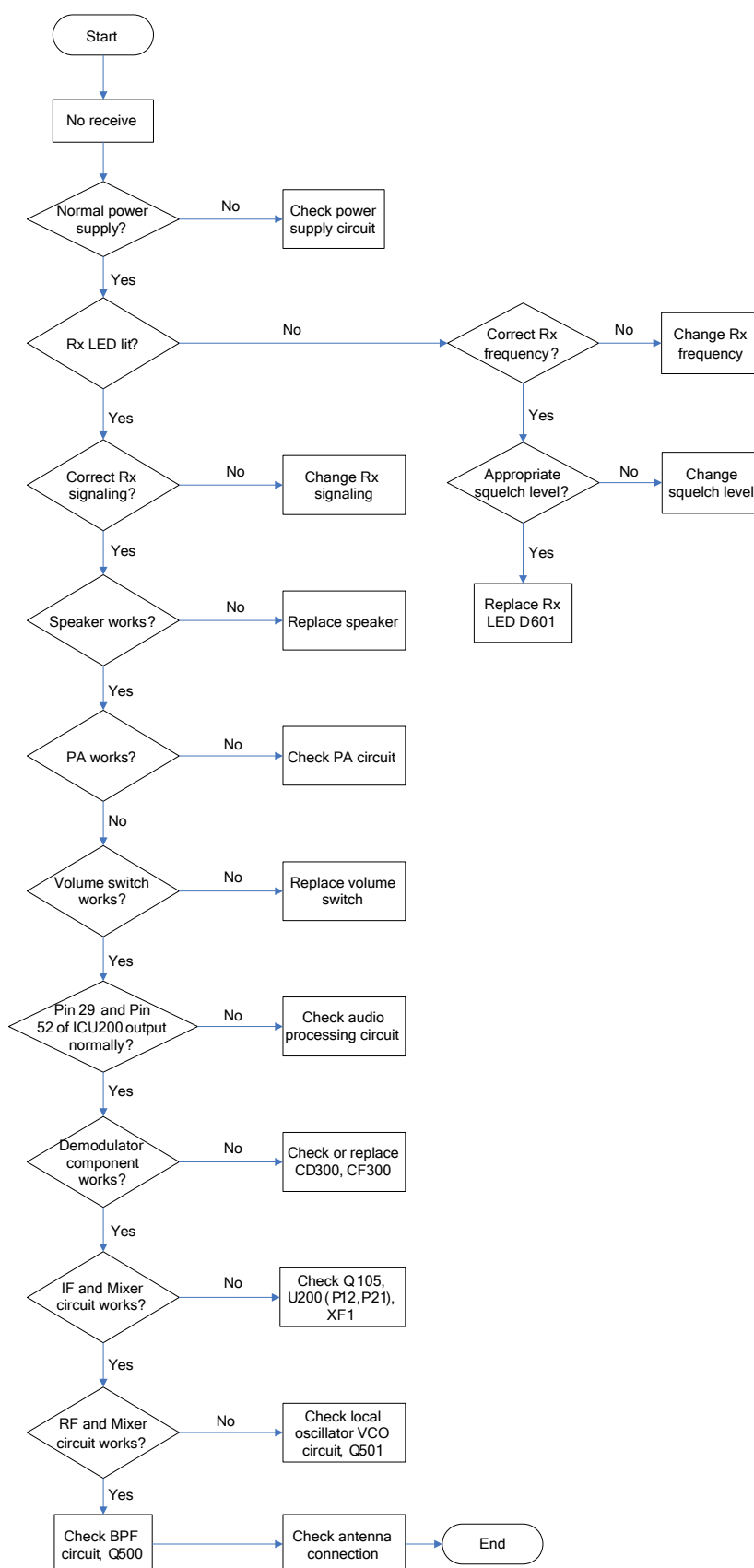
<b>Detect in Tx status</b>		
Green LED glows (70%-100%).	More than 7.46V	Time: 13.95 minutes
Orange LED glows (50%-70%).	7.17V - 7.46V	Time: 13.95 minutes
Red LED glows (30%-50%).	6.92V - 7.17V	Time: 13.95 minutes
Red LED flashes (<30%).	5.97V – 6.92V	
Red LED flashes and transmission prohibit tone sounds.	Less than 5.97V	
<b>Detect in Rx and Standby status (or press the Battery Strength Indicator key)</b>		
Green LED glows (70%-100%)	More than 7.85V	Time: 134.55 minutes
Orange LED glows (50%-70%)	7.53V - 7.85V	Time: 134.55 minutes
Red LED glows (30%-50%)	7.30V - 7.53V	Time: 134.55 minutes
Red LED flashes (<30%)	6.56V - 7.30V	Time: 20 minutes
Red LED flashes and low battery alert tone sounds every ten seconds.	5.70V - 6.56V	
Radio is shut off.	Less than 5.70V	

# Troubleshooting Flow Chart

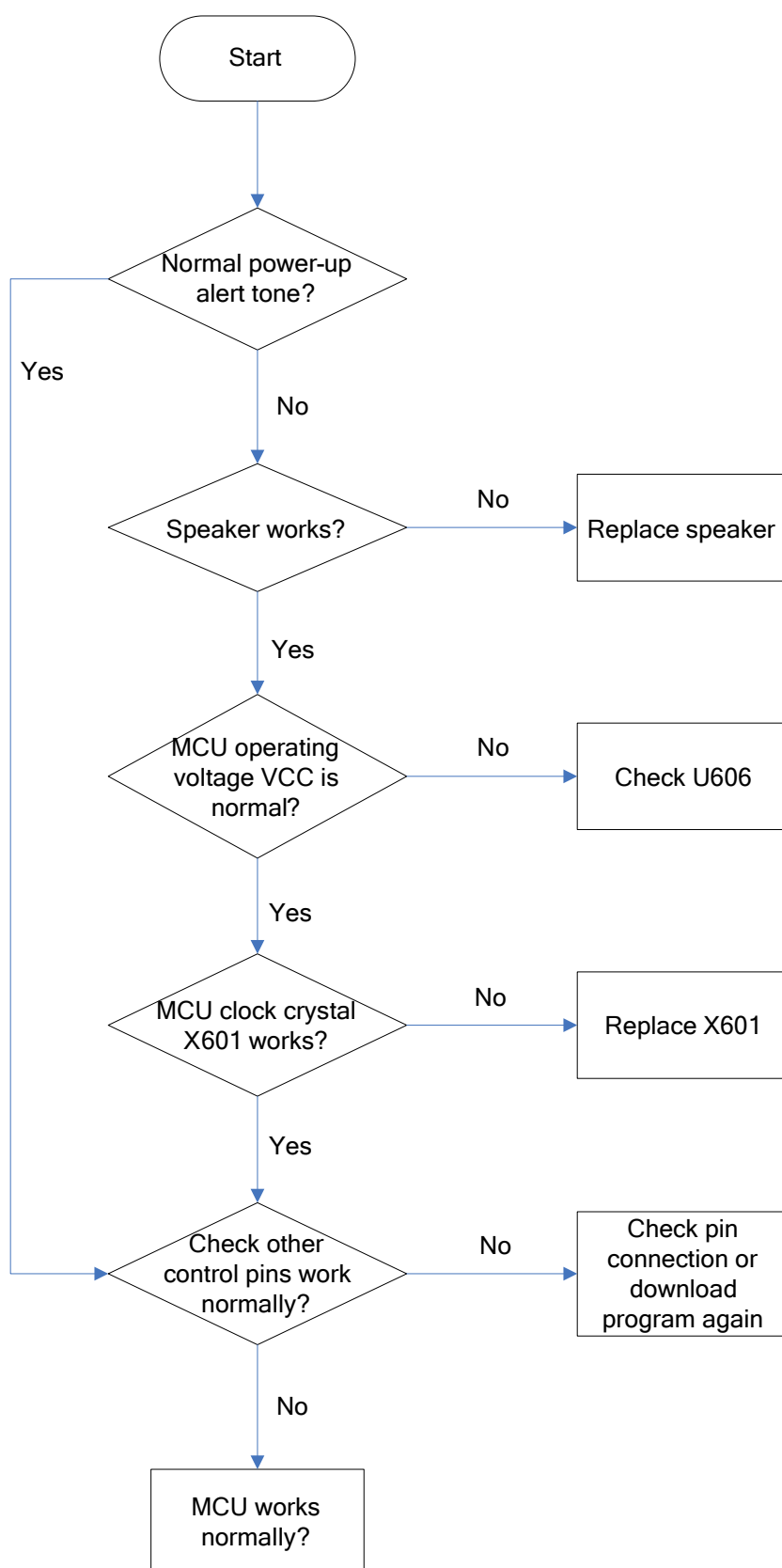
## Transmit Circuit



# Receive Circuit



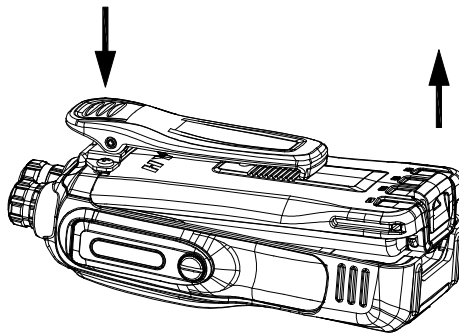
# MCU



## Disassembly and Assembly for Repair

### Removing the Battery

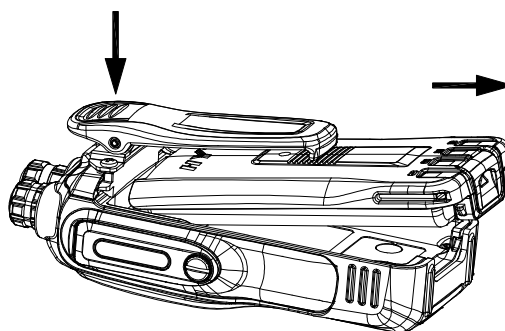
1. Turn off the radio first.
2. Press the top part of the belt clip to make its bottom upward.
3. Slide the battery latch upward. See Figure 1.



**Figure 1**

4. When the battery bottom gets tilted, release the latch and remove the battery See Figure 2.

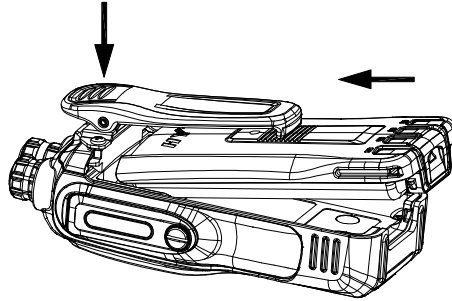
Note: Make sure the battery bottom is slightly tilted to avoid severe abrasions between the battery tab and the slot in the top part of the radio.



**Figure 2**

## Attaching the Battery

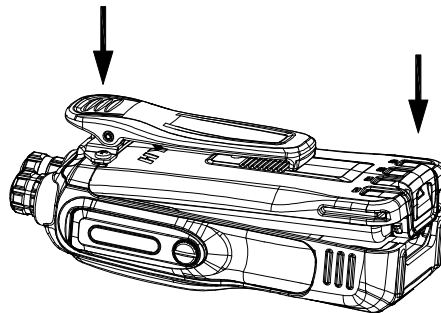
1. Press the top part of the belt clip to make its bottom upward.
2. Fit the extensions at the top of the battery into the slot at the top of the radio's body. See Figure 3.



**Figure 3**

3. Slightly press the bottom of the battery until a click is heard, See Figure 4.

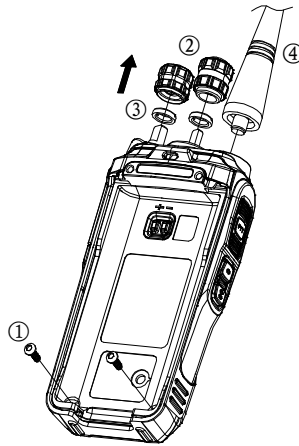
Note: If the battery latch is loose or unsecured, please remove and attach it again.



**Figure 4**

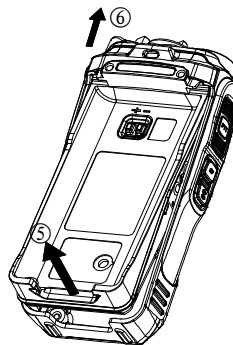
## Removing the Chassis

- ① Remove the 2 screws at the bottom of the radio.
- ② Remove the Volume Control knob and Channel Selector knob.
- ③ Unscrew the two fixing nuts by professional instruments.
- ④ Remove the antenna. See Figure 5.



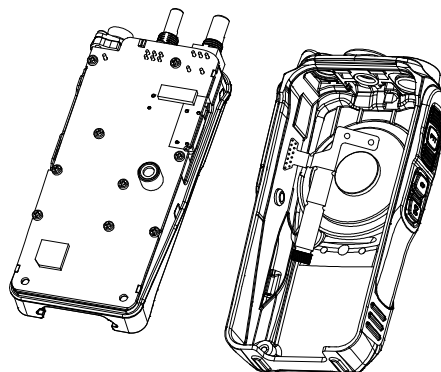
**Figure 5**

- ⑤ Lift the bottom of the aluminum chassis, and pull the aluminum chassis backwards and take it out.
- ⑥ Remove the rear cover, as shown in Figure 6.
- ⑦ Remove the FPC on the PCB.



**Figure 6**

- ⑧ See Figure 7 for the disassembled parts.



**Figure 7**

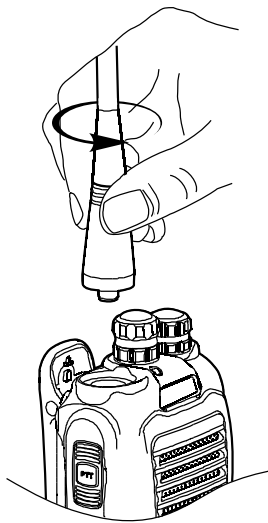


## Attaching the Chassis

Follow steps reverse to that you remove it.

## Removing the Antenna

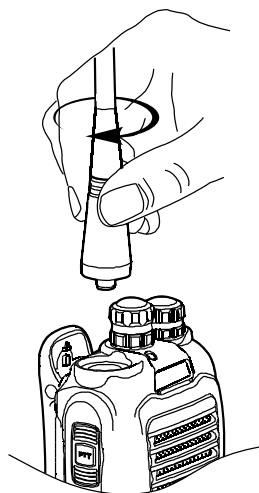
Turn the antenna counter-clockwise until you can remove it. See Figure 8.



**Figure 8**

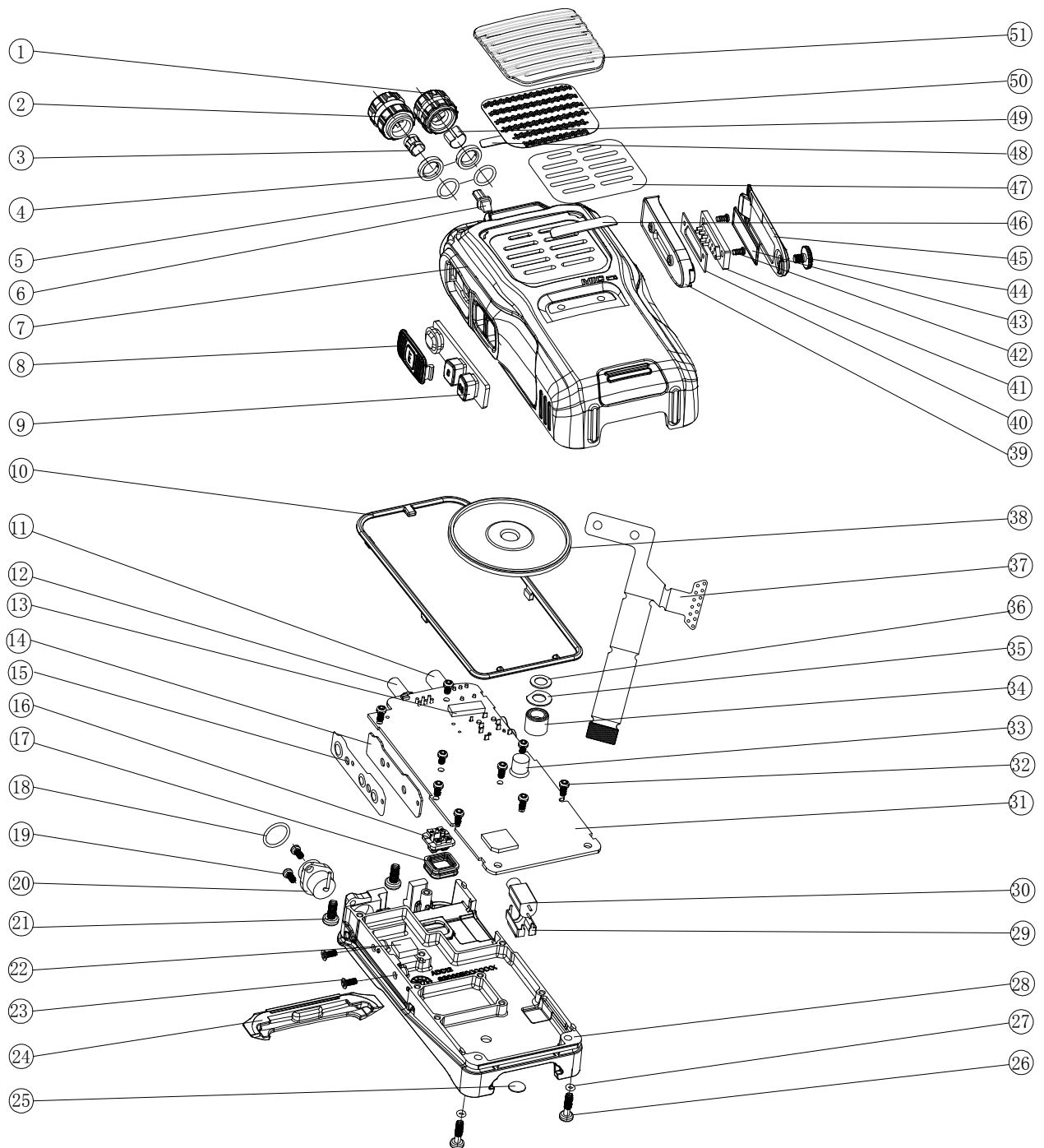
## Attaching the Antenna

1. Align the threaded end of the antenna with the antenna connector located at the top of the radio.
2. Turn the antenna clockwise to fasten it. See Figure 9.



**Figure 9**

# Exploded View

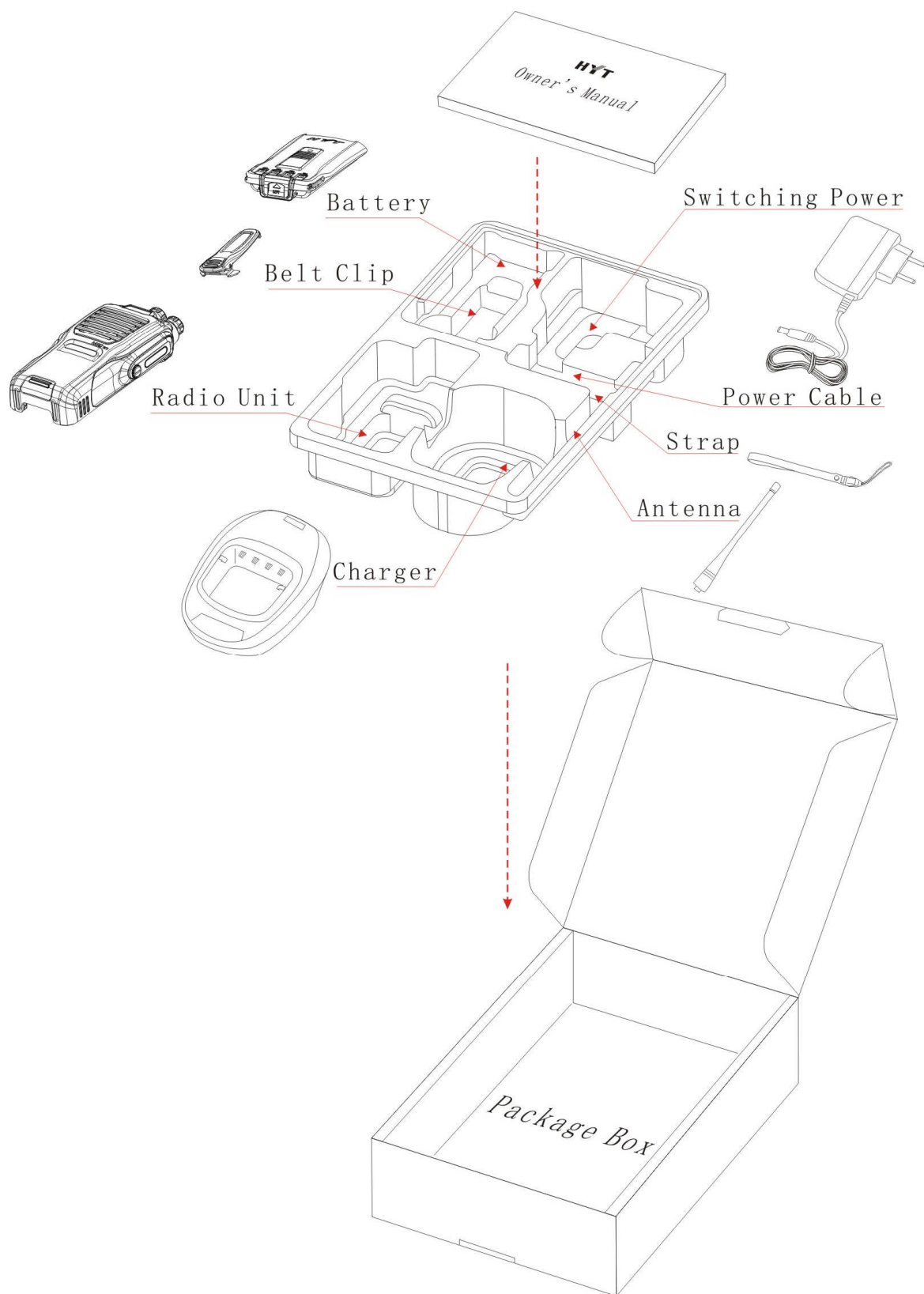


## TC-610P Parts List 2

No.	Material No.	Description	Qty. (PCS)	Remarks
1	6000846100000	Volume control knob 00 (RoHS)	1	
2	6000845100000	Channel selector knob 00 (RoHS)	1	
3	6201066000000	Inner lining of knob 00(RoHS)	1	
4	7207002200200	Nut 00(RoHS)	2	
5	6100334000000	O-ring washer for channel selector knob 00 (RoHS)	2	
6	6000847000000	Light guide 00 (RoHS)	1	
7	6000885100000	Ultrasonic front case, black&yellow, PC (EXL9330) 00 (RoHS)	1	
8	6000842100000	Plastic PTT key 00 (RoHS)	1	
9	6100312000010	Silicone rubber PTT key 01 (RoHS)	1	
10	6100307000010	Waterproof ring 01 (RoHS)	1	
11	4302020000140	Volume switch (RoHS)	1	
12	4304030000010	Gray code rotary switch (RoHS)	1	
13	5202020100040	Connector (RoHS)	1	
14	4100610300000	PTT key PCB 0.6T/2L/1P 00(RoHS)	1	
15	7300032000000	Metal dome for PTT key 00 (RoHS)	1	
16	5205000001000	Battery connector 00 (RoHS)	1	
17	6100314000000	Waterproof ring for battery connector 00 (RoHS)	1	
18	6100335000000	O-ring washer for antenna 00 (RoHS)	1	
19	7102504000300	Machine screw 00 (RoHS)	2	
20	4400100008000	SMA connector, female, 50Ω (RoHS)	1	
21	7103006001000	Machine screw M3.0*6.0mm 00 (RoHS)	2	
22	7500116000020	Heat sink pad 02 (RoHS)	1	
23	7102005000000	Machine screw 00 (RoHS)	2	

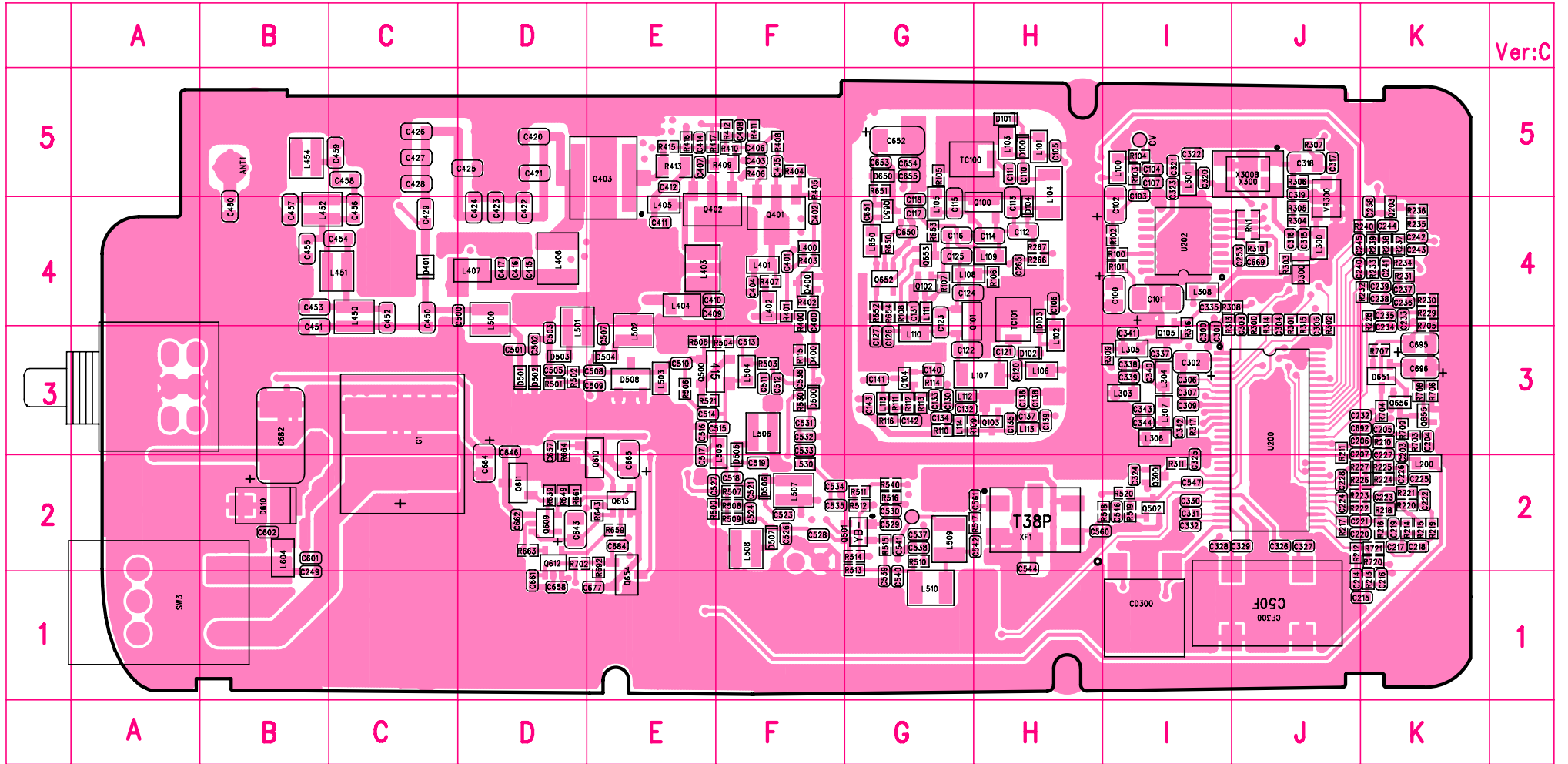
24	6000843100000	Rear cover, black PC (EXL9330) 00 (RoHS)	1	
25	7400218000000	Waterproof and dustproof breathable film 00 (RoHS)	1	
26	7102508000010	Machine screw 01 (RoHS)	2	
27	6100333000010	O-ring washer for screw 01 (RoHS)	2	
28	6300058000010	Aluminum chassis 01 (RoHS)	1	Vibrate type and non-vibrate type
	6300058000100	TC-610P 2-Tone aluminum chassis 00 (RoHS)		
29	6201744000000	Motor fixing sheet 00 (RoHS)	1	For Vibrate capable model only
30	5402000000110	Vibrating motor (RoHS)	1	For Vibrate capable model only
31	Varies as frequency band	PCB	1	
32	7101904020200	Self-tapping screw 00 (RoHS)	9	
33	5002220000070	MIC (RoHS)	1	
34	6100345000000	Mic cover 00 (RoHS)	1	
35	7400217100000	Mic pad 00 (RoHS)	1	
36	7400222000000	Waterproof mic net 00 (RoHS)	1	
37	41006101006C0	FPC (RoHS)	1	
38	5001210000030	Speaker 16Ω 1W /2W 83dB Φ45mm (RoHS)	1	
39	6000711000000	Fixing bracket for earpiece jack 00 (RoHS)	1	
40	7400128010100	Waterproof PC pad for earpiece 00 (RoHS)	1	
41	6000198000020	Earpiece jack 02 (RoHS)	1	
42	7101904020100	Self-tapping screw 00 (RoHS)	2	
43	6100411000000	Waterproof ring for accessory cover 00 (RoHS)	1	
44	6000651000000	Accessory cover 00 (RoHS)	1	
45	7102802010200	BS screw 00 (RoHS)	1	
46	8600610500500	TC-610P HYT model label 00 (RoHS)	1	
47	7400202000000	Felt speaker 00 (RoHS)	1	
48	8600610600000	HYT LOGO PC label 00 (RoHS)	1	
49	6201739000000	Inner lining of knob 00 (RoHS)	1	
50	6201540000000	Stainless steel net 00 (RoHS)	1	
51	6000862000000	Front cover 00 (RoHS)	1	

# Packing

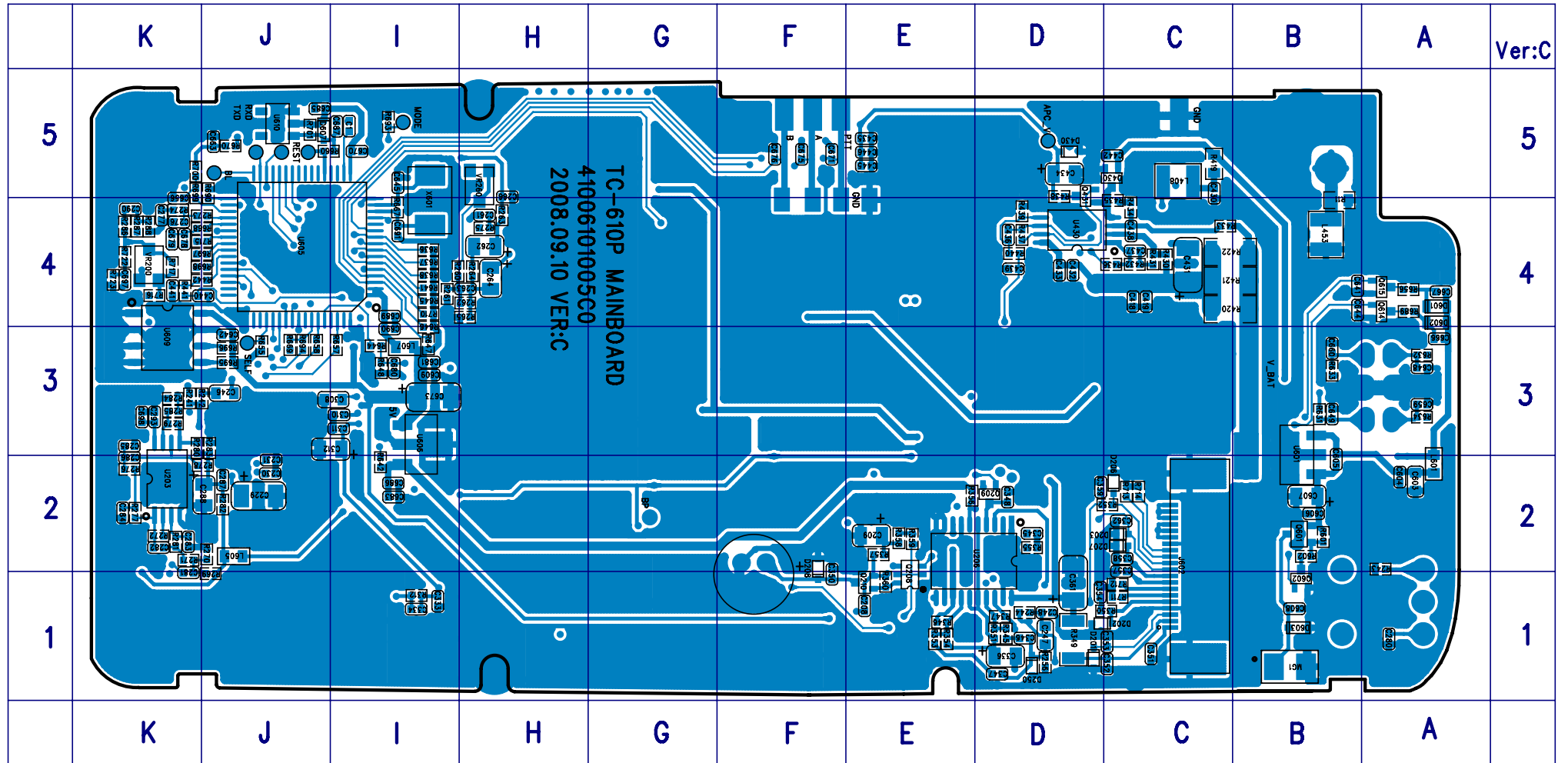


## TC-610P UHF PCB View

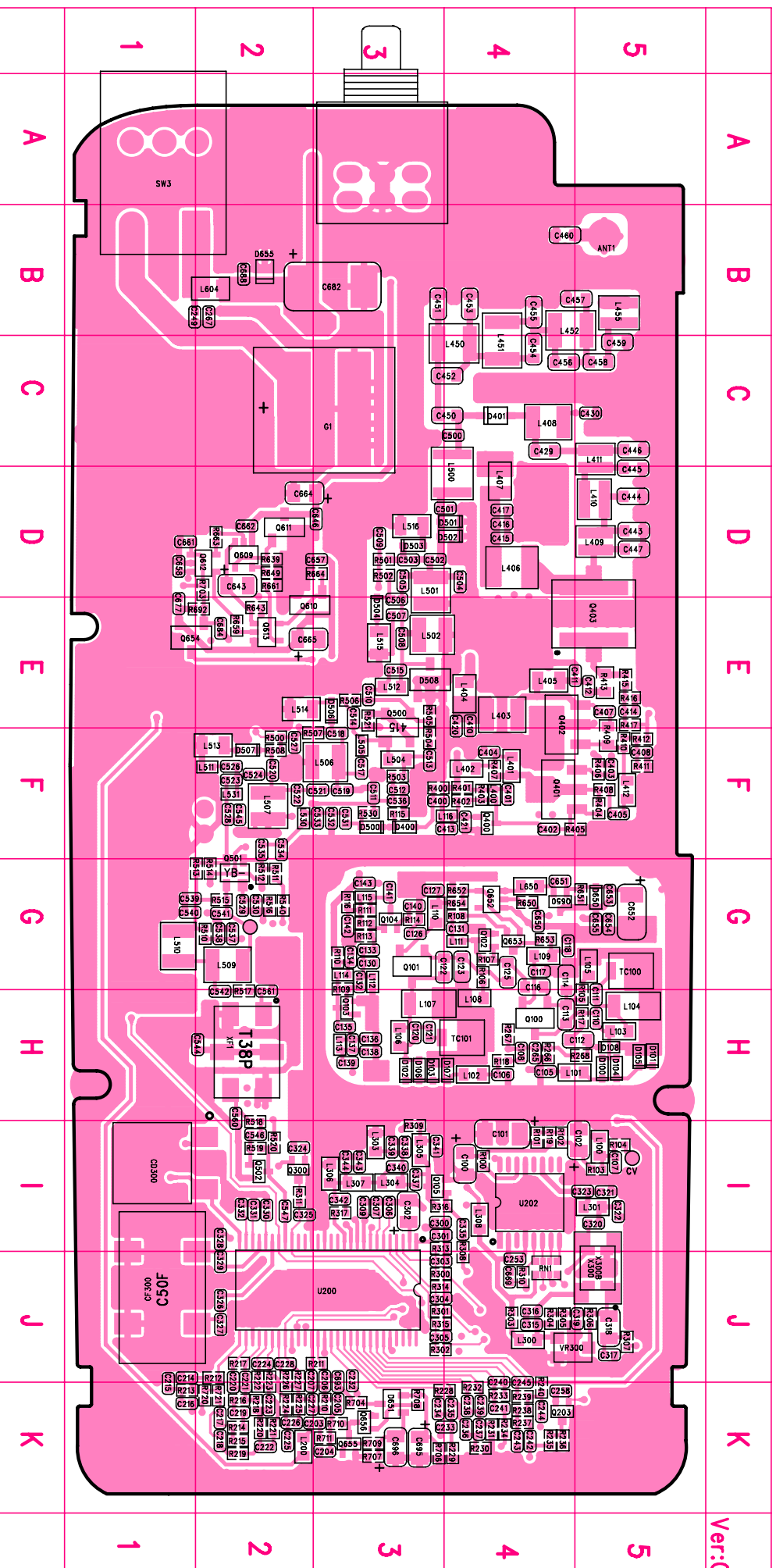
### Top Layer



## TC-610P UHF PCB View Bottom Layer

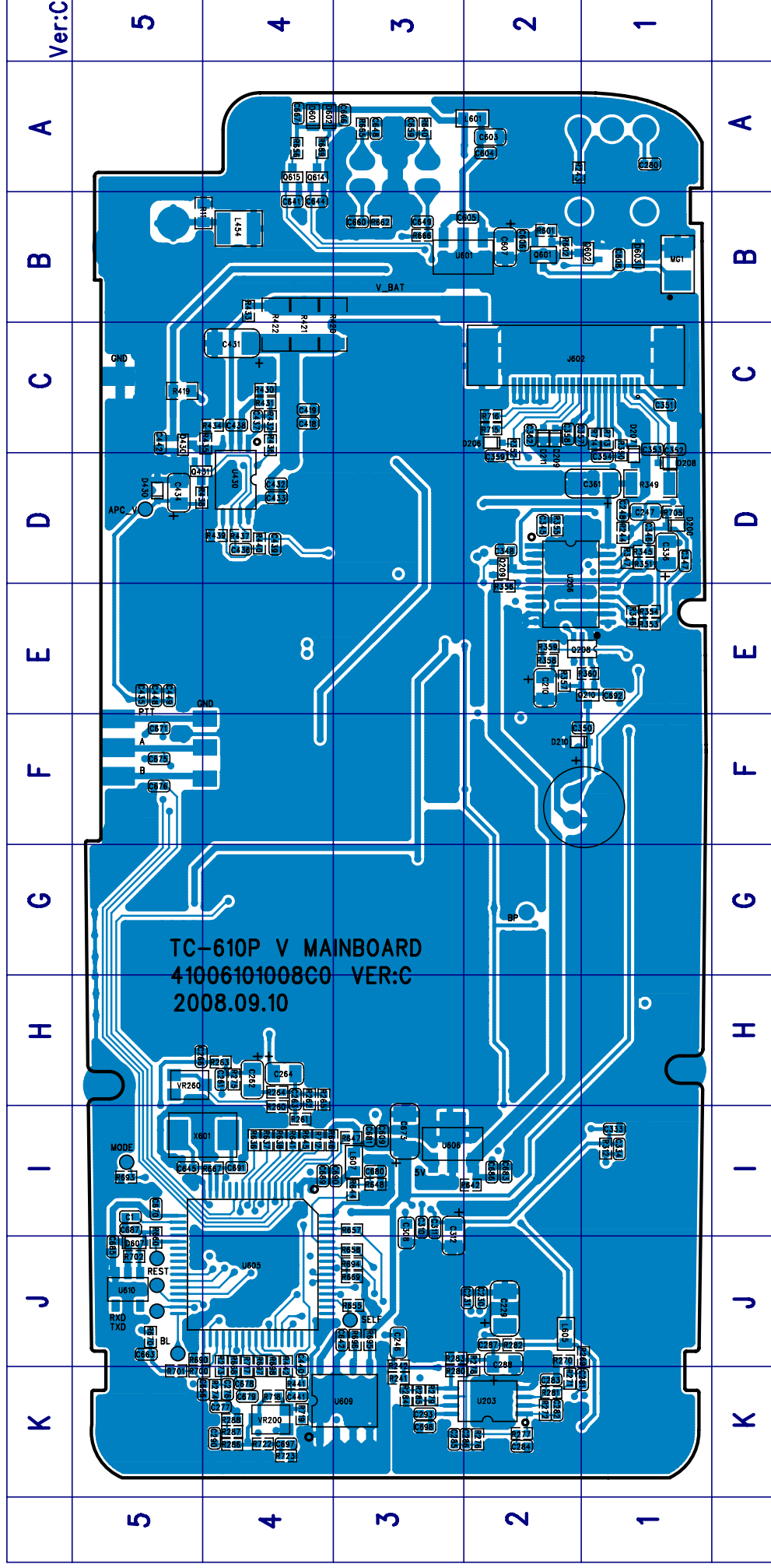


# TC-610P VHF PCB View Top Layer

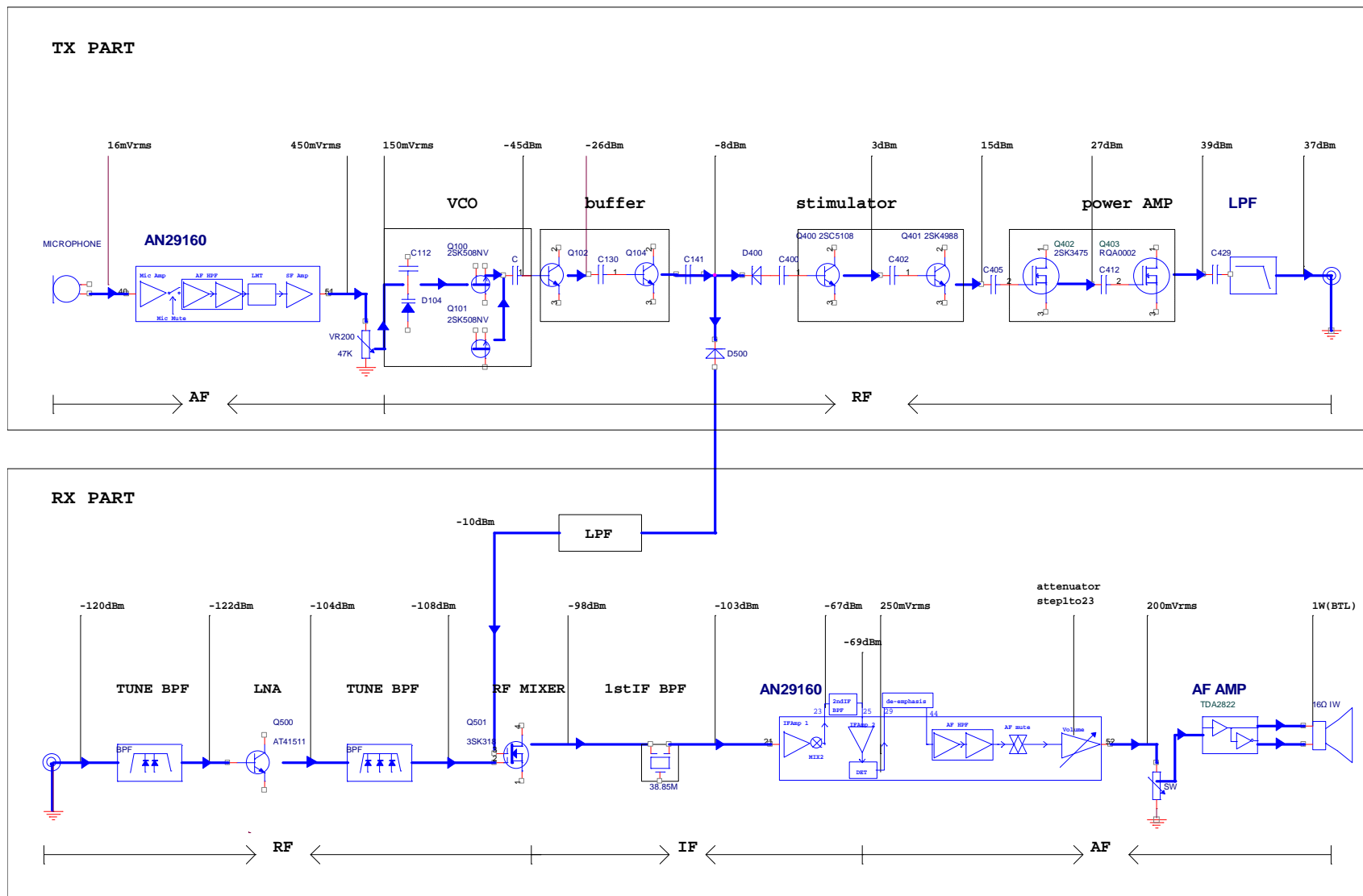




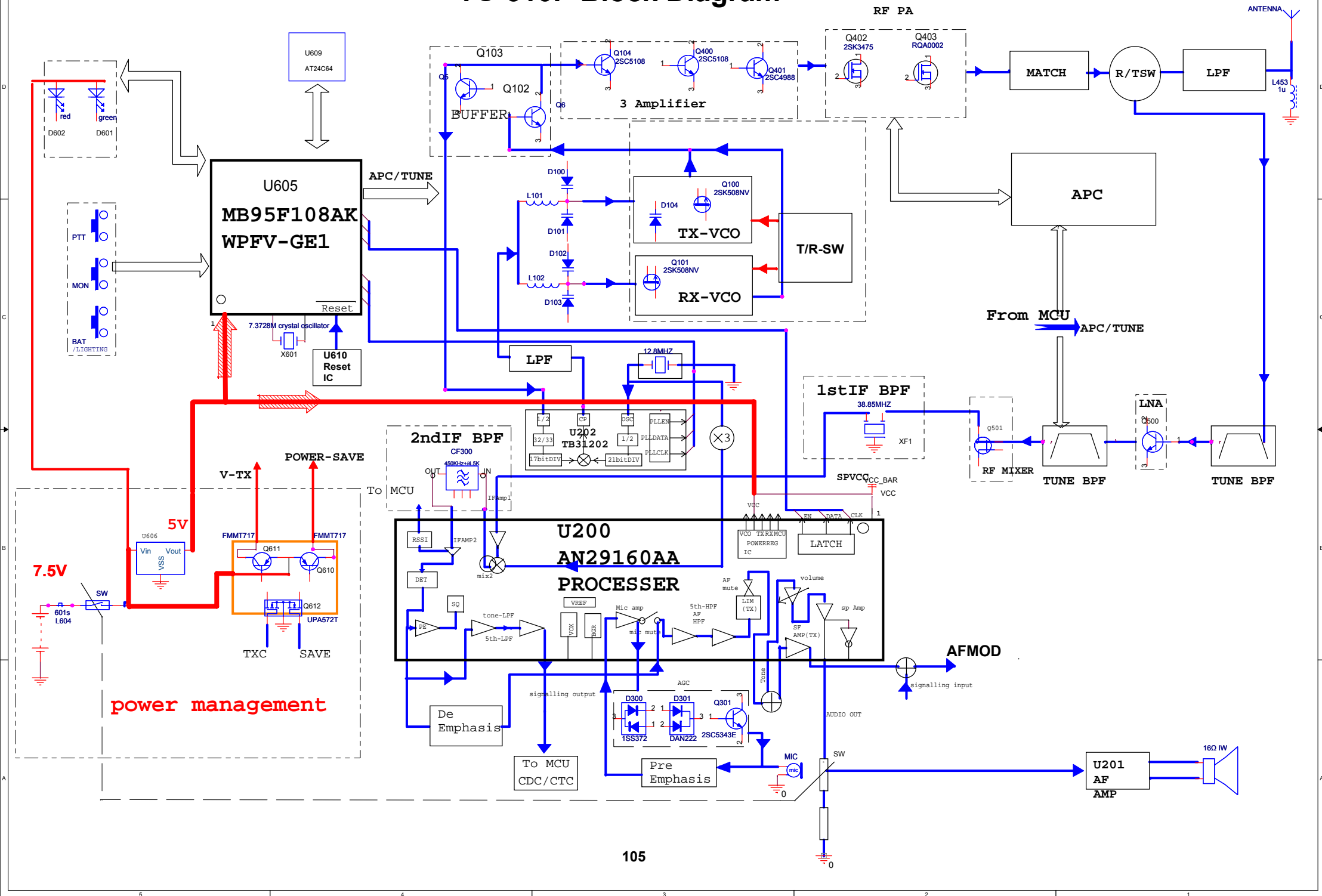
# TC-610P VHF PCB View Bottom Layer



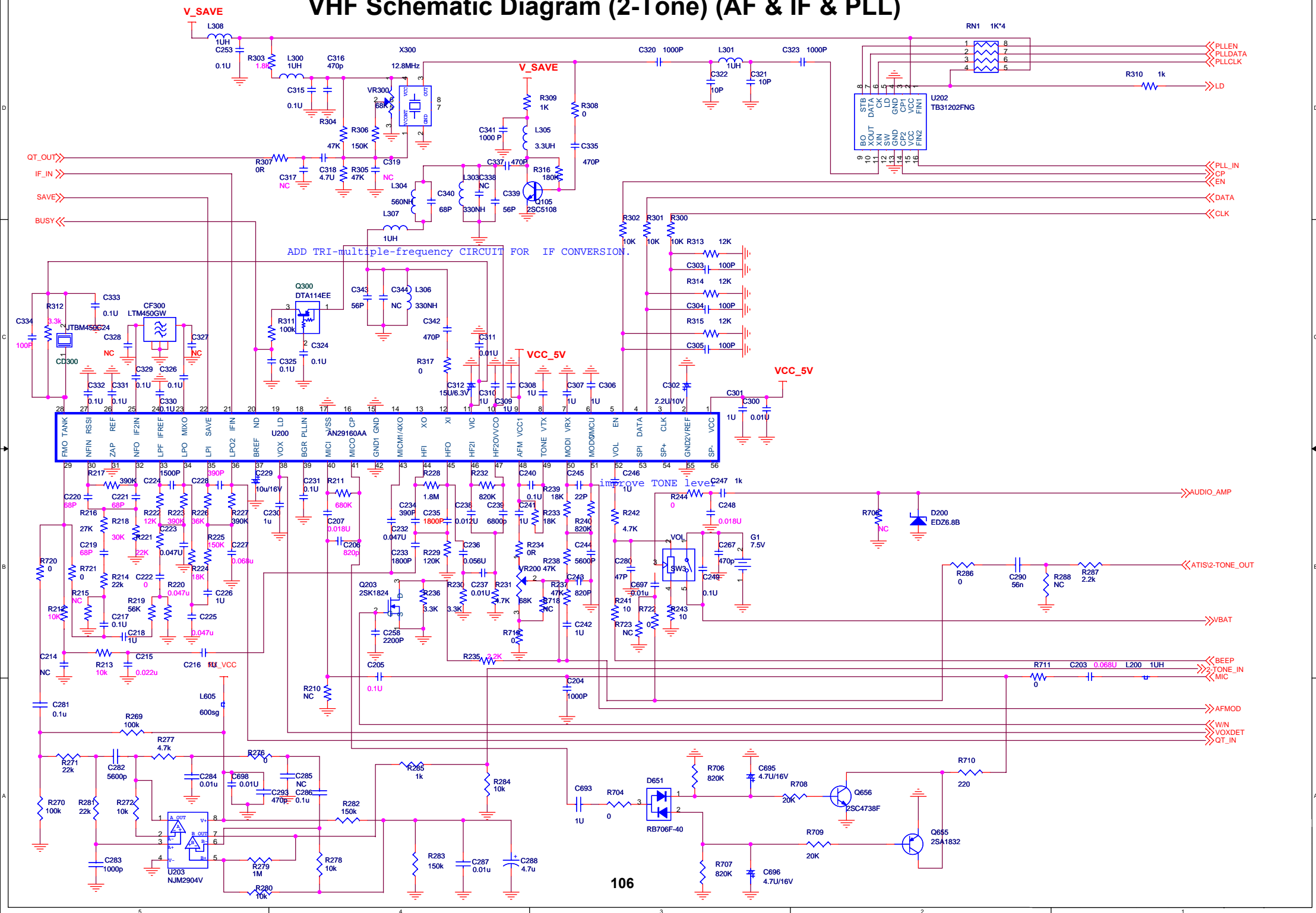
# TC-610P Level Diagram



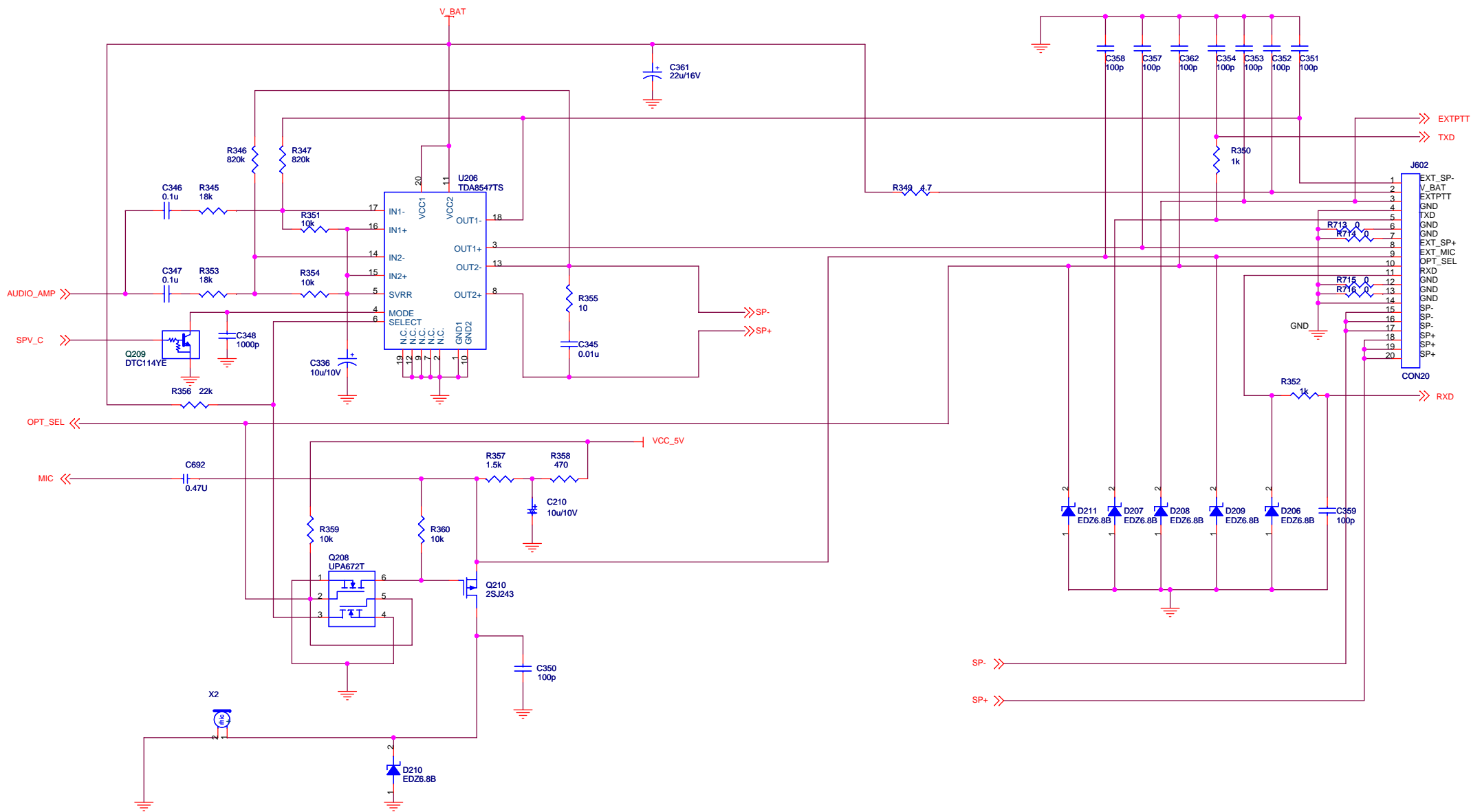
# TC-610P Block Diagram



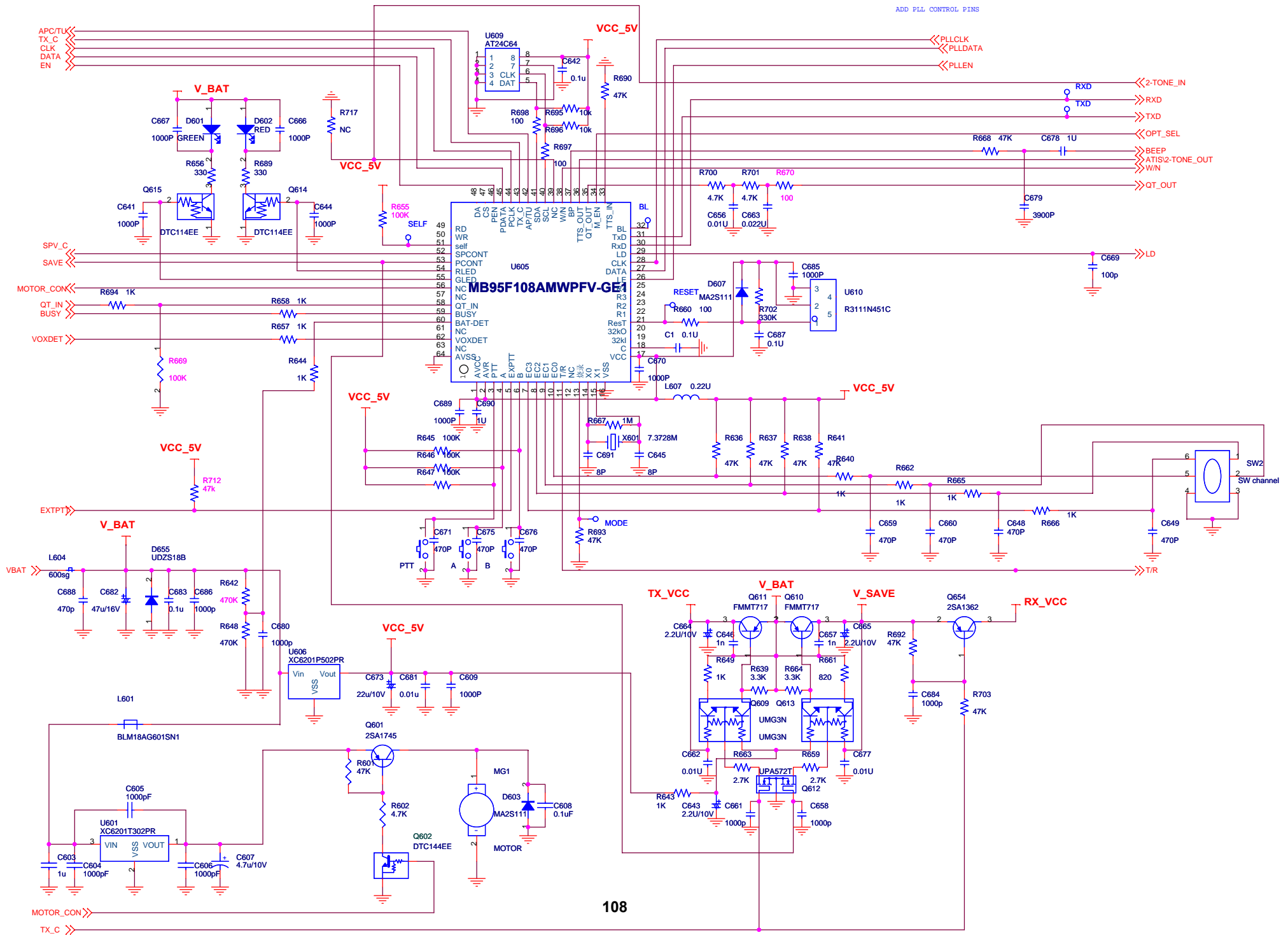
### VHF Schematic Diagram (2-Tone) (AF & IF & PLL)



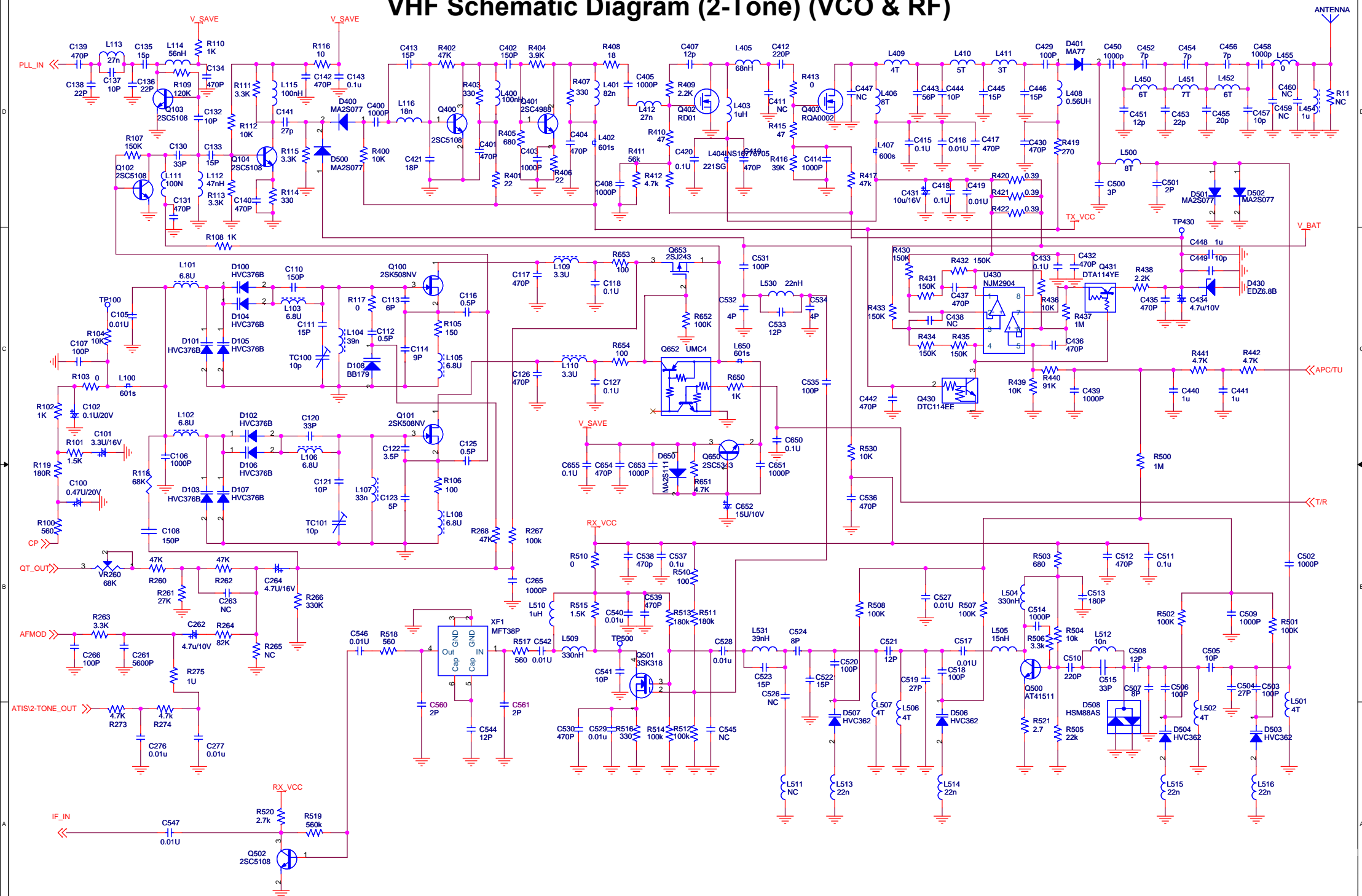
# VHF Schematic Diagram (2-Tone) (AF AMP & EXT)



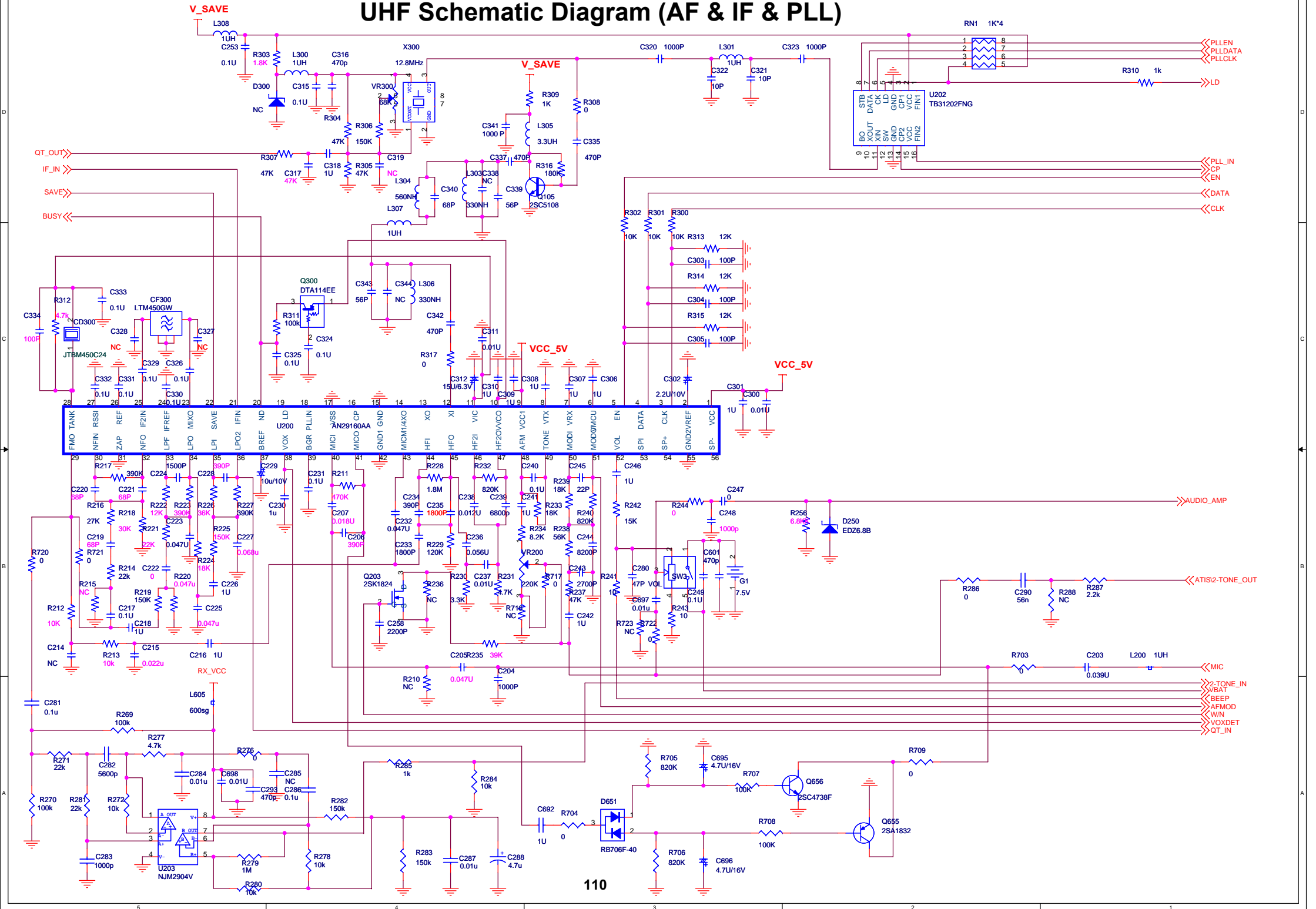
# VHF Schematic Diagram (2-Tone) (MCU & POWER)



### VHF Schematic Diagram (2-Tone) (VCO & RF)

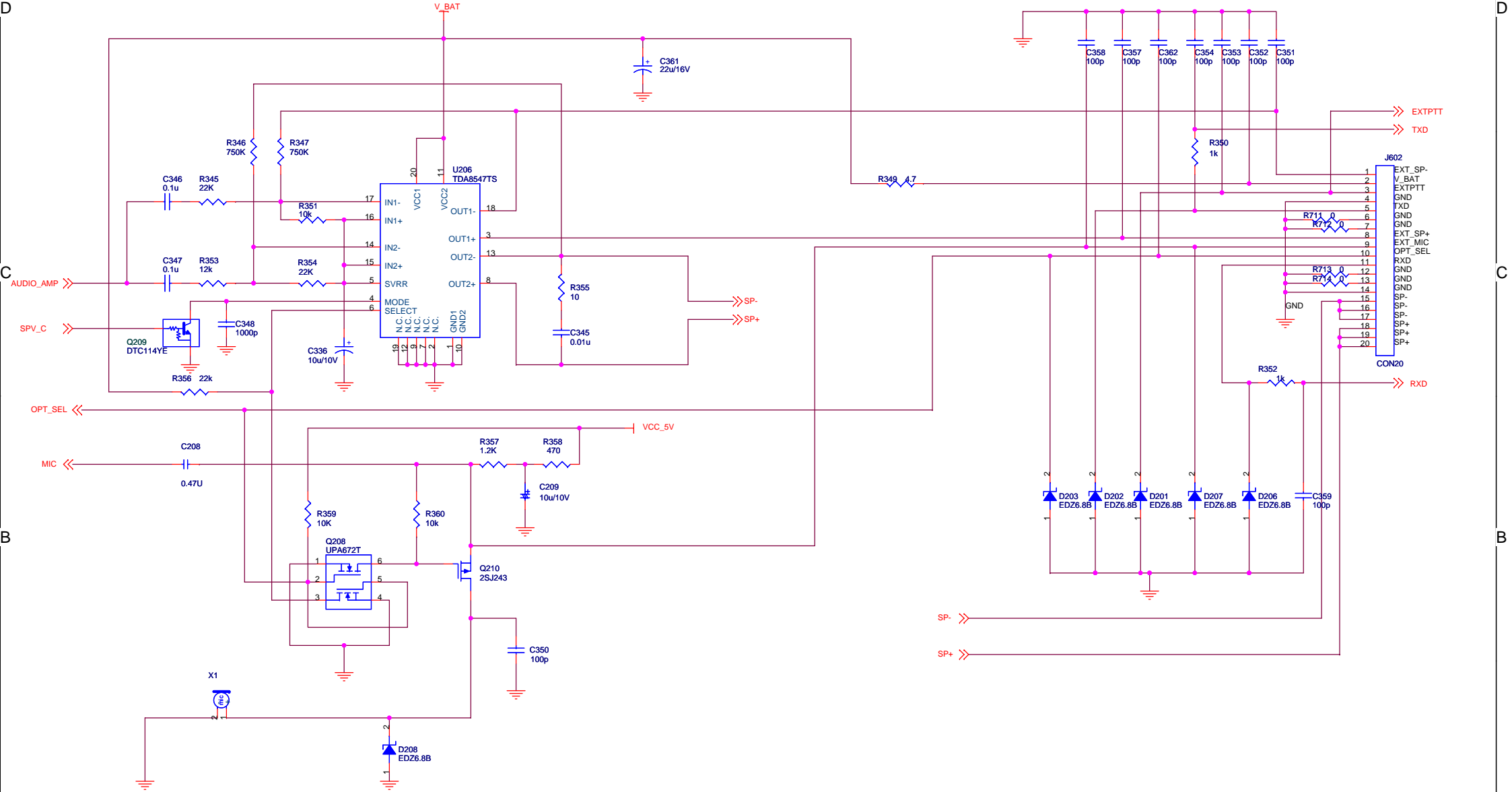


## UHF Schematic Diagram (AF & IF & PLL)

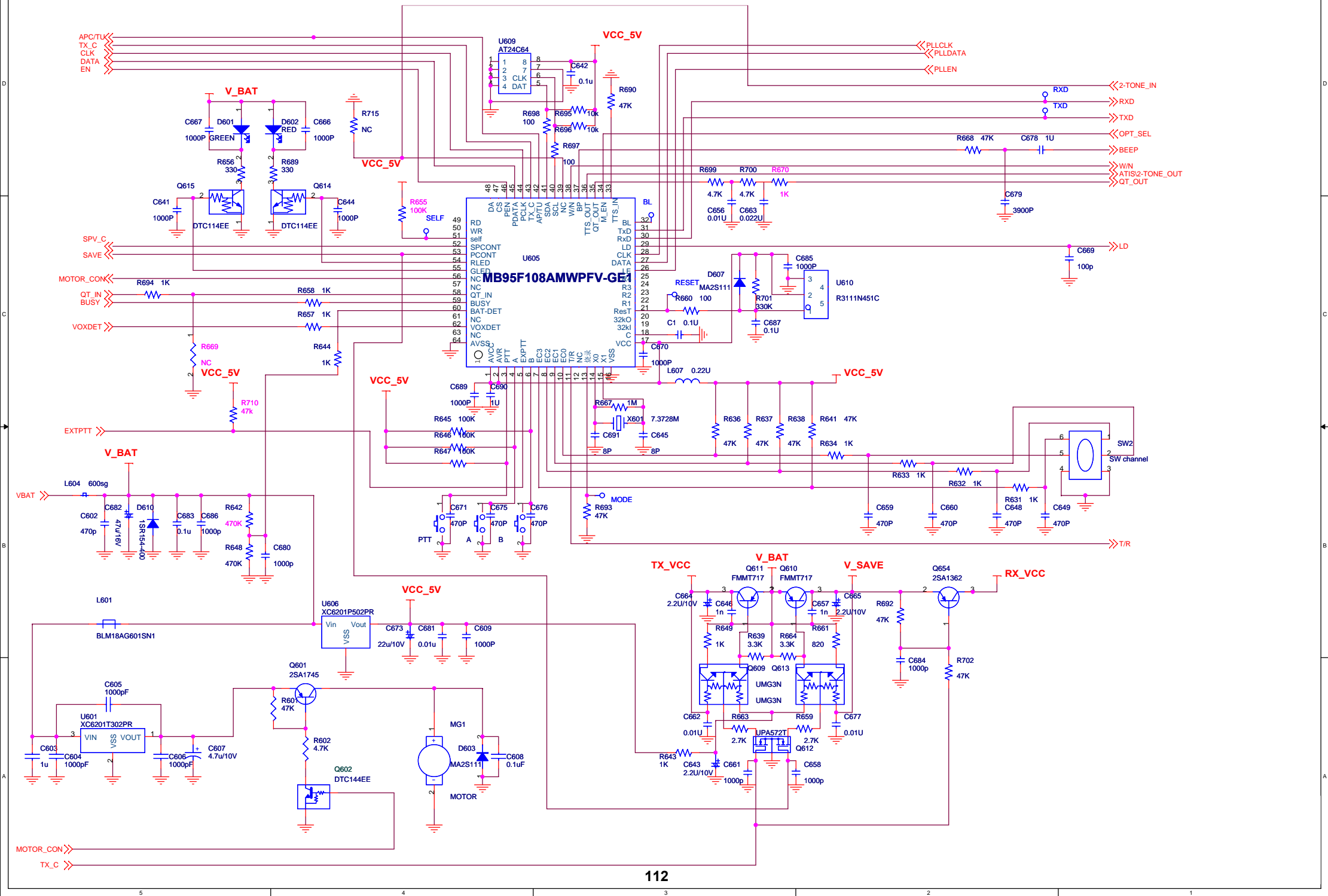




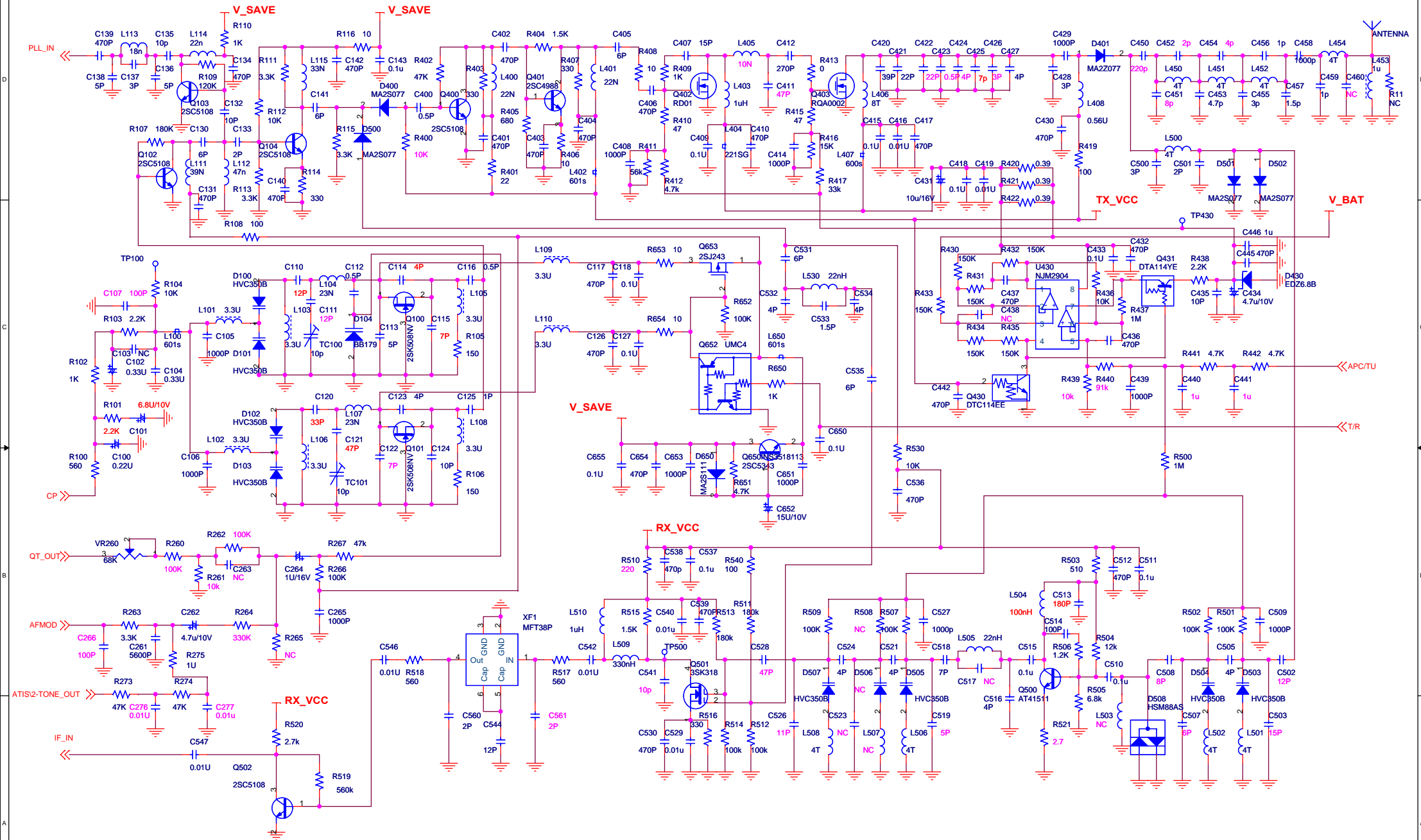
UHF Schematic Diagram (AF AMP & EXT)



# UHF Schematic Diagram (MCU & POWER)



## UHF Schematic Diagram (VCO & RF)



# Specifications

General Specifications	
Frequency Range	V: 136-174MHz U (3): 440-470MHz U (5): 350-390MHz
Channel Capacity	16
Channel Spacing	25/12.5 KHz
Operating Voltage	7.5V DC
Battery	1200mAh Li-Ion battery
Battery Life (5-5-90 Duty Cycle)	About 10 hours
Operating Temperature	-20 - +50℃
Dimensions (H×W×D) (with battery, without antenna)	119mm x 55mm x 33mm
Weight (with antenna & battery)	275g
Frequency Stability	±2.5ppm
Receiver	
Sensitivity	-119dBm/-118dBm
Selectivity	≥70dB(W)/60dB(N)
Intermodulation	≥65dB
Spurious Response Rejection	≥70dB
Rated Audio Power Output	800mW
Rated Audio Distortion	≤5% (800mW)

Transmitter	
RF Power Output	4.8±0.2W (H)/2.0±0.2W (L)
Spurious and Harmonics	-36dBm<1GHz -30dBm>1GHz
Modulation Limiting	≤5KHz/2.5KHz
FM Noise	40dB (W)/35dB (N)
Modulation Distortion	≤5%

**Note:** All Specifications are tested according to TIA/EIA-603, and subject to change without notice due to continuous development.

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